CIO

THE MAGAZINE FOR INFORMATION EX

JULY 1995
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SPECIAL ISSUE

The Knowledge Enterprise

A Prescription For Managing Organizational Intelligence

Pfizer's Vita Cassese

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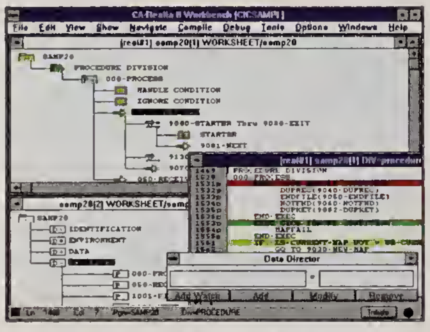
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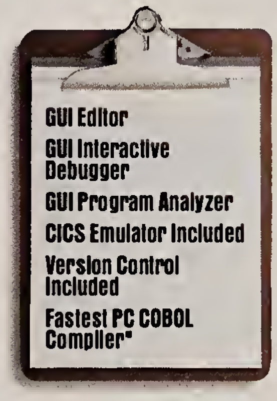

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SPECIAL ISSUE

BUSINESS INFORMATION **38**

Scavenger Hunt

Whether it lies within your employees, outside of your gates or in the depths of overgrown databases, competitive wisdom needs to be actively sought, recognized, nurtured and refined.

By Leigh Buchanan

Medicine woman **48**
Cover photo by Kent Hanson

KNOWLEDGE MANAGEMENT **48**

Rx for Success

At Pfizer, IT means more than information technology. It also stands for insightful thinking.

By Alice Dragoon

Getting there from here **60**

INFORMATION MAPPING **60**

Guiding Principles

Knowledge is a valuable asset, but not if you can't find it when you need it. Increasingly, organizations are creating "maps" of their intellectual assets and letting them guide the way.

By Carol Hildebrand

THE CIO ROLE **68**

The Medium and the Message

Whatever approach a company takes to merging content (information) and its delivery mechanisms (technology), the CIO is in the perfect position to preside over the marriage.

By Leigh Buchanan

CIOs in the know **68**

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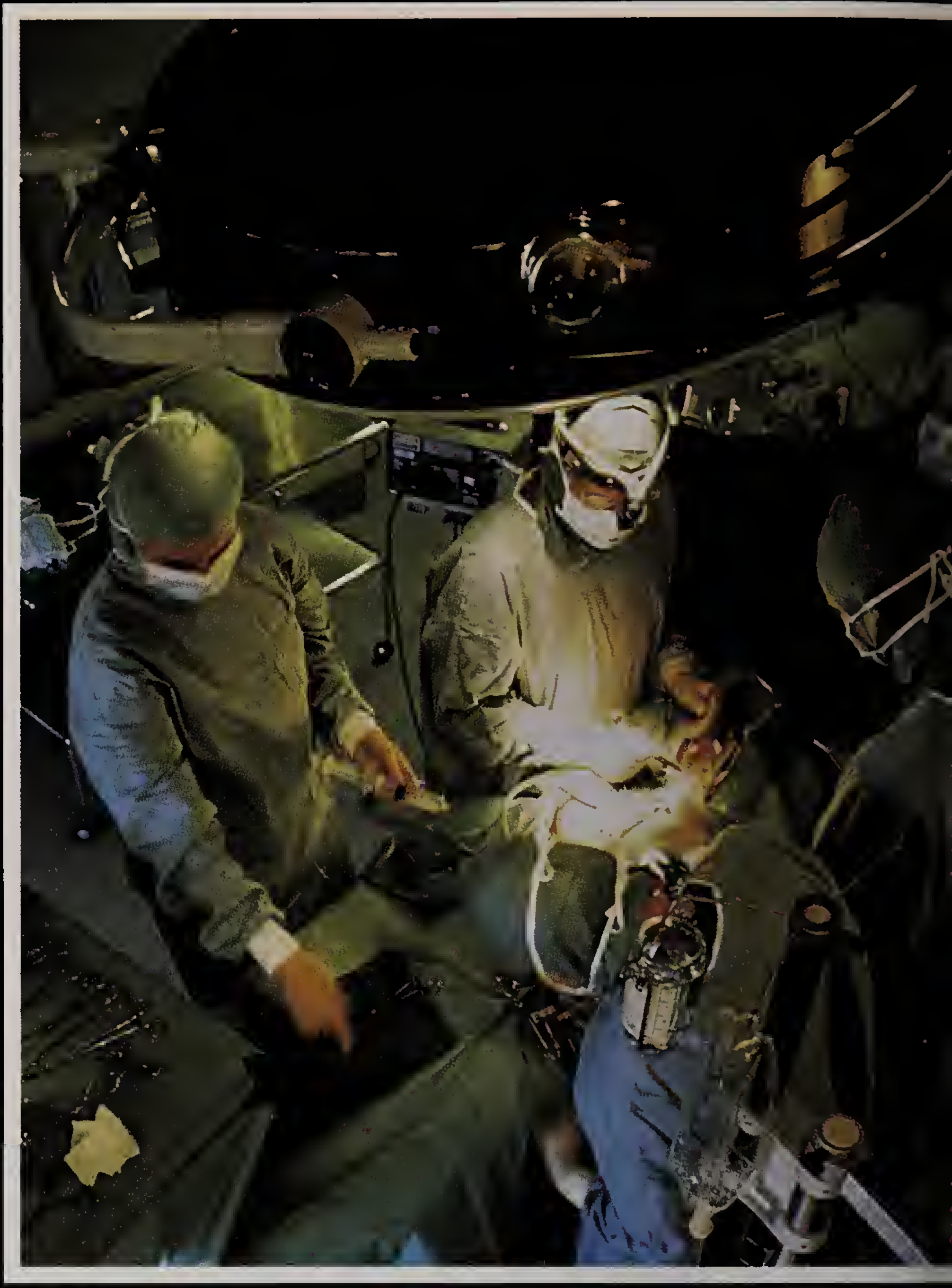

James Wells, VP and CIO
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INSIGHTS: INTERNATIONAL STUDIES

Companies venturing into foreign markets have some serious homework ahead of them.

By Thomas J. Howard

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OUTLOOK: CLIENT/SERVER EVERYTHING

A survey of top IS executives shows that the client/server revolution sends ripples in all directions.

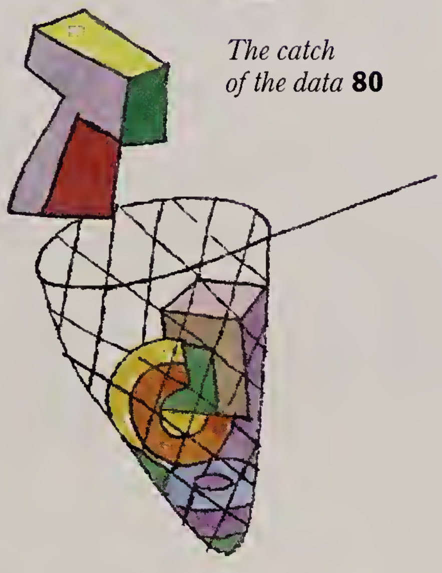
By Jeffrey Plewa and Steven Pliskin

INFORMATION MANAGEMENT **80**

STATE OF THE ART: THE OUTSIDE TRACK

Meeting the growing demand for external information can be tricky. And the best way to track it will vary from one company to the next.

By Tracy Mayor



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CIO LIGHT: NO NEWS IS GOOD NEWS

A champion of the people's right to know, he refused to let truth stand in his way.

By Stanley Bing

THE I.S. ORGANIZATION **98**

THE LAST WORD: HIRING OUTSIDE THE BOX

Next time you're in the market for help, consider bringing aboard a librarian, a journalist or an anthropologist.

By Laurence Prusak

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LETTER FROM THE EDITOR

What business are you in: technology or information? In the minds of many IS executives, the answer to that question is not clear.

When it comes to information technology, the medium is not the message. Yet, as Larry Prusak, a principal of Ernst & Young's Center for Business Innovation, observes, many companies assume that building a technology infrastructure is the same thing as harnessing strategic knowledge.

This special issue on business information, created and developed under the able leadership of Senior Editor Leigh Buchanan, makes plain the difference between delivering business information and deploying it.

Until recently, business information was thought of as reports, statistics, market share figures, P&Ls. Now there's a broader and richer definition. Business information can include direct observations, impromptu conversations, informal notes. Outside the corporation, it includes online services, databases, government agencies, scientific papers—all waiting to be tapped.

Business decisions are often made by weighing internal and external information together. Successful corporate decision-making requires understanding the relationships among *all* information sources.

So it is that assembling the technology infrastructure—the "pipes" through which information flows—is no longer enough. The content is also becoming the responsibility of IS professionals.

As Buchanan points out in "Scavenger Hunt," which begins on Page 38, all companies have access to essentially the same information. The challenge is to mine it and act on it faster than the competition. Delivering competitive intelligence fast is one area in which IT can shine. Buchanan also profiles four information executives who are deeply involved in defining their companies' information needs. (Please see "The Medium and the Message," Page 68.)

Locating and tapping into the intellectual capital dispersed throughout a corporation has always been a challenge. In "Guiding Principles," which begins on Page 60, Senior Writer Carol Hildebrand probes the concept of information mapping. A knowledge map helps people quickly zero in on the information they need—skills, expertise and information that reside on paper and in people's heads. Companies are finding that a small investment in information cartography pays big benefits.

Associate Editor Alice Dragoon's profile of Pfizer's U.S. Pharmaceuticals Group focuses on the company's knowledge-management practices. (See "Rx for Success," beginning on Page 48.) At Pfizer, the combined Systems and Market Research department manages and mines information from a vast array of internal and external sources.

CIOs are not just in the technology business. They're also in the information business.

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CIO

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Editorial Offices CIO Communications, Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208 (508) 872-0080, FAX (508) 879-7784. Printed in the U.S.A. **Subscriber Services** (800) 788-4605, FAX (508) 872-0618. **List Services** (800) 859-LIST

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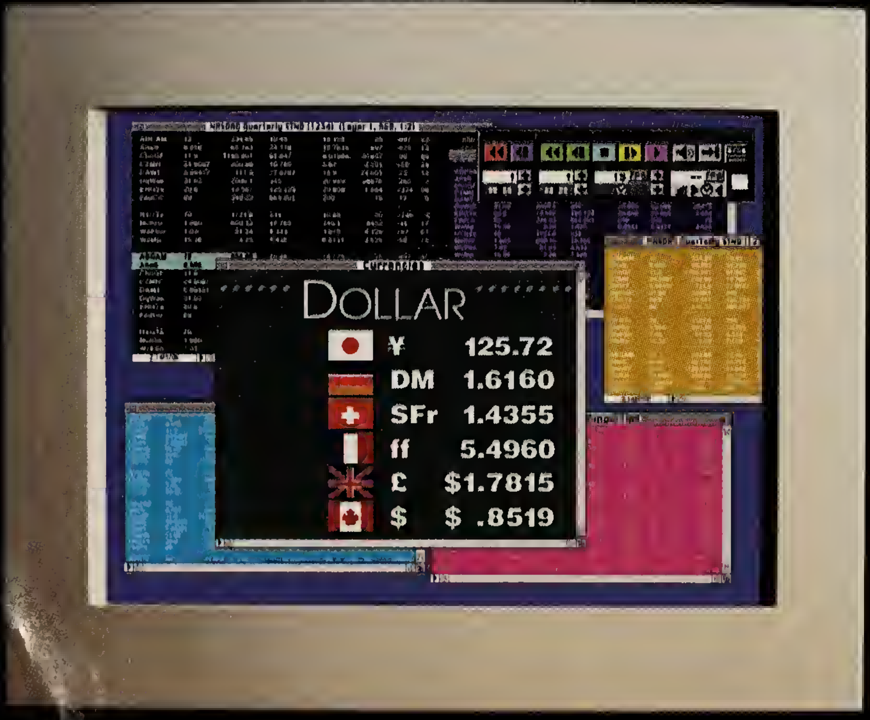

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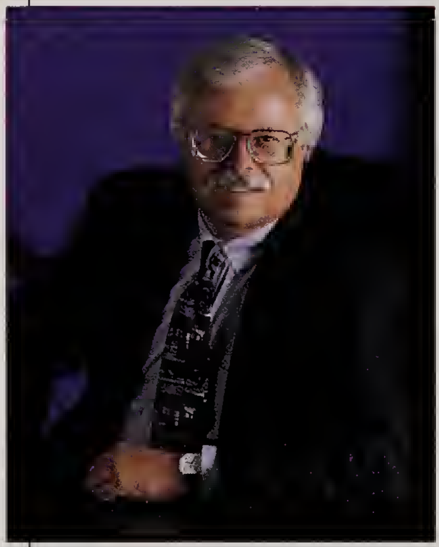

> *"The latest and greatest and freshest solutions to customer problems reside in the minds of individuals, not in some report or database."*
> *–Victor Baillargeon*
> *Vice President of Knowledge Transfer*
> *Buckman Laboratories International Inc.*

If this quote doesn't get you thinking, the title of the person who said it certainly should. Victor Baillargeon is the "vice president of knowledge transfer." Knowledge transfer?

Buckman Labs' CEO, Robert Buckman, has wholeheartedly embraced the idea that knowledge is power. He has charged Baillargeon with opening up the floodgates to allow communication to flow freely and abundantly throughout the organization. Like other forward-thinking CIOs and CEOs, these executives have come to the realization that the more an employee knows, the more he or she can contribute to the organization.

And Buckman Labs is not alone. In "The Medium and the Message," starting on Page 68, we also look at how other CIOs are emphasizing the "information" part of the term information technology. These executives are well worth emulating. In the near future, CIOs who rise to the challenge to reform the IT function into a symbiosis between content and content delivery stand a better chance of being perceived as corporate strategists, not merely technology "bits and bytes" managers.

Indeed, this entire issue is dedicated to new ways of viewing business information. After reading through it, I guarantee you will walk away with some fresh ideas for deploying information as a strategic resource throughout your organization.

P.S. We are now taking reservations for the next CIO Perspectives conference, "The Psychology of IT: The CIO's New Mind Set," to be held Oct. 15-18, 1995, at the Hyatt Grand Cypress Resort in Orlando, Fla. To reserve your space, or for more information, please call 800 366-0246.

PHOTO BY WEBB CHAPPELL

Coming In CIO

Special Issue:

The CIO-100

Learn from the best. In our eighth annual CIO-100 issue, we'll examine organizations that are exemplars of best practices in enterprisewide business processes. Many companies today are looking to improve their business practices in several strategic areas, either by modeling internal or external practices, or by benchmarking the practices of other firms with reputations for excellence in a given area. We'll honor 100 firms that are noted for best business practices in customer satisfaction, global operations, supply-chain management, finance/accounting or human resources development and show what role IT plays in their success.

Airport '95

The riveting visuals of inadvertently airborne Denver baggage gave everyone (but the Denver airport planners) some comic relief last year, but managing an airport infrastructure is a formidable feat—at the heart of which lies plenty of IT. *CIO* profiles the Houston International Airport and examines the role its CIO plays in making the many and varied planes run on time.

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TRENDLINES

THE KNOWLEDGE ENTERPRISE

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BUSINESS INTELLIGENCE

THE CEO RORSCHACH TEST

Before you start ferreting around a competitor's hidy-holes trying to figure out how much it pays employees and what its secret formula for Product X is, you might want to ask yourself a simple question: Who's runnin' the joint?

The art of analyzing leaders' personalities—old hat in State Department circles, where it has long been applied to foreign rulers—is swiftly becoming a tool for businesses as well. After all, "companies are composed of individuals," says Patrick Marren, senior consultant at The Futures Group in Glastonbury, Conn. "In order to understand a company's strategy, you should know something about the decision-making styles of the leaders of that company."

As part of its information-gathering services, The Futures Group prepares customized profiles of corporate decision makers, sometimes for purposes of competitive intelligence but more often to guide companies mulling acquisitions and joint ventures. The idea, says Marren, is to give the parties a better idea of what married life may be like. For example, had Steve Jobs and John Sculley undergone such analysis, it would have been evident that "their personality types were not optimal for two people who had to work together to make the company a success."

The researchers consider personal characteristics most likely to affect the way a company is run—such as whether a leader is autocratic or a consensus builder—and keep an eye out for details that seem out of sync with the subject's usual behavior. Information already in the public domain accounts for 75 percent of the final portrait. "A press release here or there won't tell you anything by itself," says Marren. "But you build a context from the public sources, and eventually a story starts to emerge."

After the public record has been exhausted, researchers interview people who have known the subject either personally or professionally. This phase is especially important to investigations of leaders at smaller, less-established companies, who may have received little press. "Obviously, you're at a disadvantage in that there's not much information about them already out there," says Marren. "On the other hand, you may be able to talk to people who have worked with them more easily."

After all the information has been gathered, the company attempts to draw conclusions using a home-grown analytical framework developed with help from professional psychologists. "We don't pin a person's personality to the wall or predict how they're going to act," says Marren. "Instead, we try to create a greater level of comfort for the client by giving them a better idea of who they're dealing with."

Marren says interest in the service is growing, a reflection, he believes, of the trend toward forging strategic partnerships and alliances. "What this really does is lay some rigor on the intuitive approach people normally take," he explains. "When the stakes are higher, people are more willing to invest in something like this."

For information, The Futures Group can be reached at 203 633-3501. ■

EXCEPTIONS RULE

What you don't know can hurt you—big time. But reading all the reports that land on your desk, let alone analyzing them for subtle patterns or variations, is well nigh impossible.

Exception Monitor, a software-agent tool from Comshare Inc., was designed to cut through the data chaff and extract the knowledge wheat. Rather than sifting for simple exceptions, the tool performs sophisticated analyses, linking exceptions back to contextual information and then communicating the results to the right people. Users are notified of variances in operational, financial and other data through a desktop application that combines exception reporting with the ability to zero in on their causes through point-and-click investigation. The product also analyzes patterns and trends, helping the organization detect trouble spots early (a machine that consistently operates above the control limit without actually stopping production, say) or track whether it is meeting its financial goals.

Comshare has also added software agents to its client/server decision-support applications. The company's Detect and Alert "robots" monitor targeted databases—textual and numeric, internal and external—for changing values, patterns and trends that match criteria pre-defined by the user. When a robot detects a significant change, it sends out an alert, displayed as a headline in the user's personalized NewsAlert electronic newspaper. Users who are out of the office can be alerted to data changes by e-mail. For information, call 800 922-7979. ■

SPECIAL ISSUE ICON BY JEAN TUTTLE; PHOTO BY TONY STONE IMAGES/PETER POULIDES

How Frito-Lay Handles the Decision Making CRUNCH

With Its Zone Workbench System Created With SAS Institute Software

Doritos® and Tostitos brand Tortilla Chips, Lay's® and Ruffles® brand Potato Chips, and Rold Gold brand Pretzels

It's hard to imagine any company that understands consumer tastes better than Frito-Lay, a leader in the U.S. salty snack category with annual revenues of more than $5 billion. Yet Frito-Lay is determined to get even closer to its 400,000 retail customers.

In fact, a decentralization effort begun in 1990 has, in the last five years, brought a renewed sense of ownership and empowerment to the 30,000 Frito-Lay employees. As part of this ownership, Frito-Lay's Information/Technology Systems department (I/TS) has created a tactical, market-driven decision support system—the Zone Workbench System—designed to get timely information in the hands of front-line managers.

It's an application built from the customer up, and the SAS® System of software has been there every step of the way.

"The Zone Manager is the first line of communication with our Route Sales force," says Tom Nealon, Director of I/TS for Frito-Lay, whose department spearheaded development of the decision support system. "We knew from the start that the Zone Workbench had to provide information that was 'actionable'. It also had to be portable across client/server, workstation, or laptop environments. Equally important was the ability to integrate multiple data sources."

Delivering More than Software Alone

"Given the tight schedule, the software company we chose had to provide superior applications development tools—as well as comprehensive training, consulting services, and documentation," adds Nealon. "SAS Institute came through on every count, proving time and again the value of having a software vendor that's as interested as we are in completing projects on time and on target."

Nealon calls the Zone Workbench "a tremendously versatile business tool proving user-friendliness, power, and portability between platforms can all operate in one package. The old-style EIS systems are antiques. The game today is to provide information that can impact the marketplace each day, for each of our customers. For Frito-Lay, SAS Institute is making sure we have the tools to make an impact."

To receive a SAS System Executive Summary, give us a call or send us e-mail at cio@sas.sas.com

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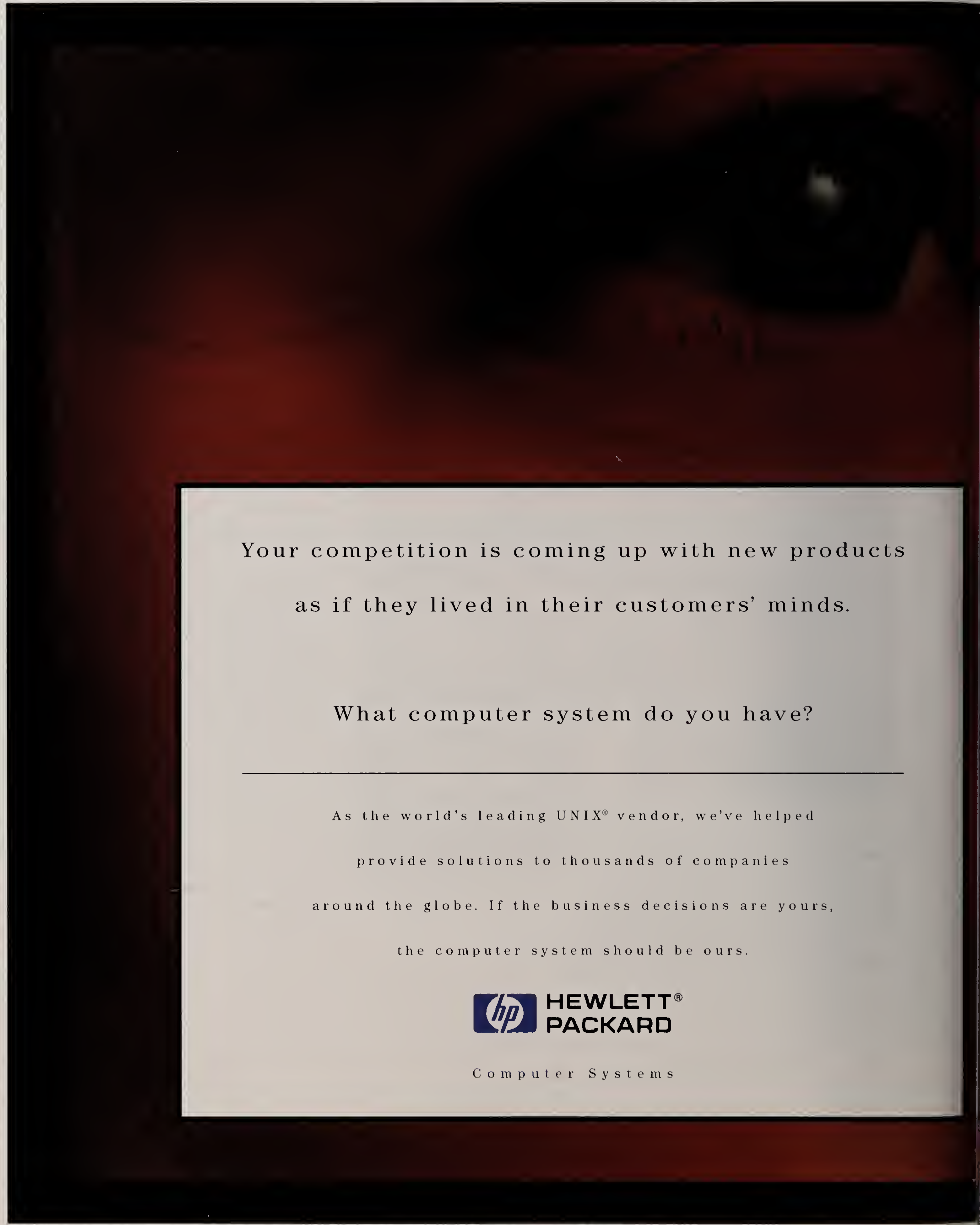Your competition is coming up with new products as if they lived in their customers' minds.

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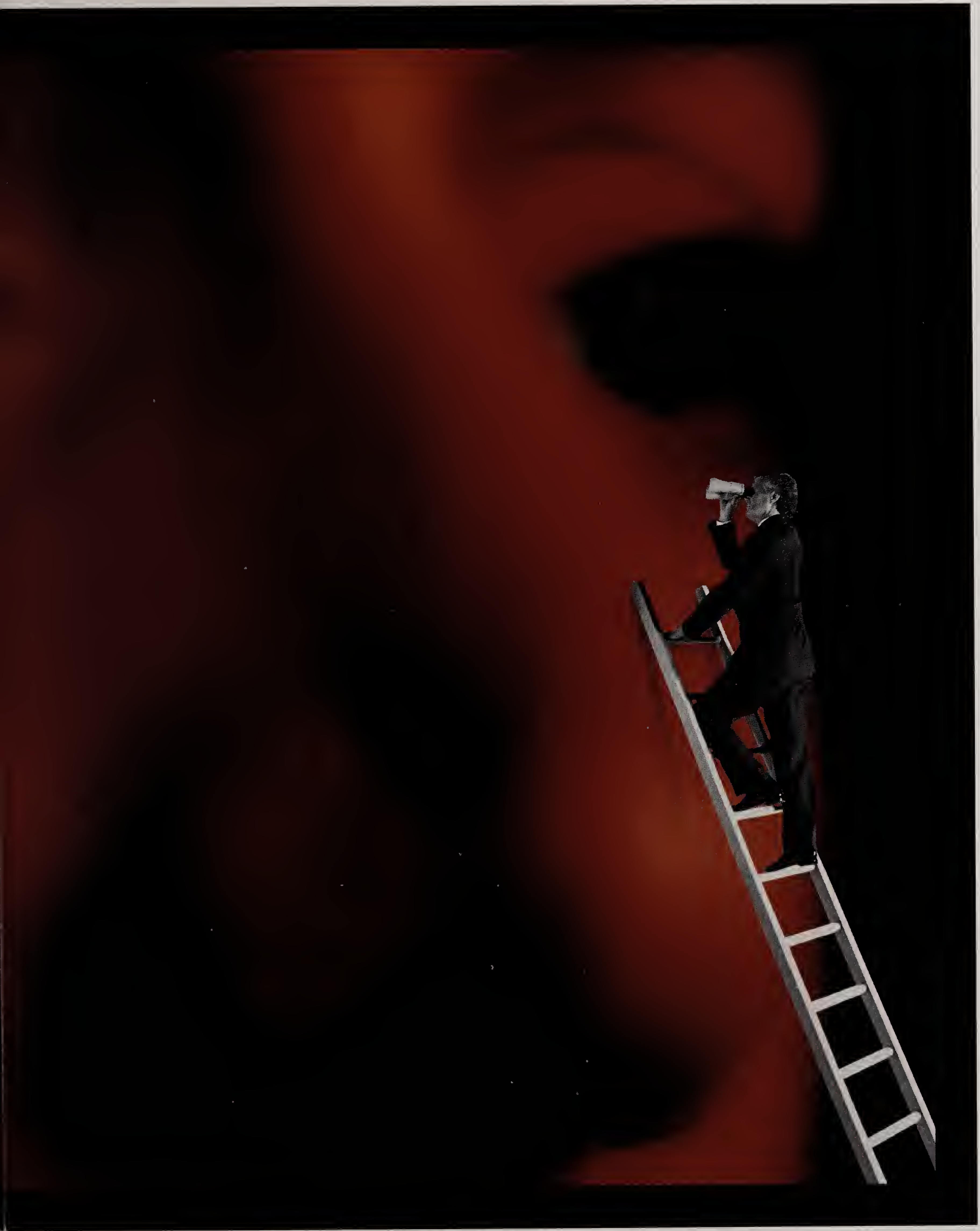
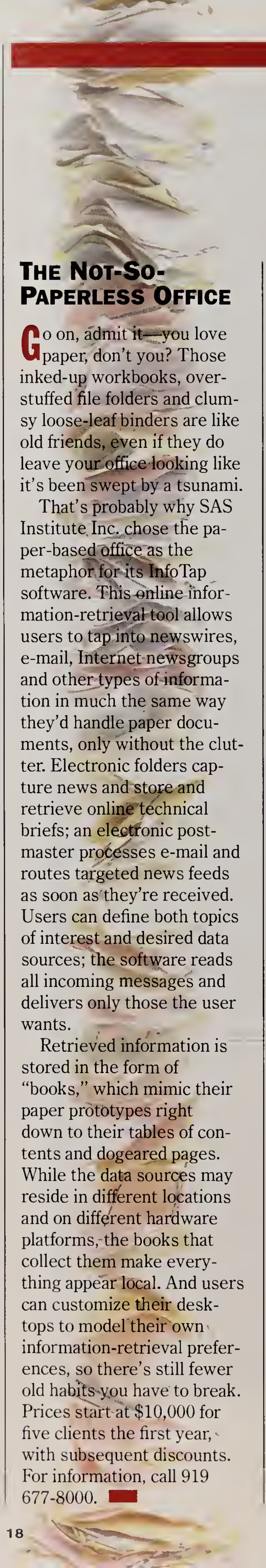


TRENDLINES

THE KNOWLEDGE ENTERPRISE



THE NOT-SO-PAPERLESS OFFICE

Go on, admit it—you love paper, don't you? Those inked-up workbooks, overstuffed file folders and clumsy loose-leaf binders are like old friends, even if they do leave your office looking like it's been swept by a tsunami.

That's probably why SAS Institute Inc. chose the paper-based office as the metaphor for its InfoTap software. This online information-retrieval tool allows users to tap into newswires, e-mail, Internet newsgroups and other types of information in much the same way they'd handle paper documents, only without the clutter. Electronic folders capture news and store and retrieve online technical briefs; an electronic postmaster processes e-mail and routes targeted news feeds as soon as they're received. Users can define both topics of interest and desired data sources; the software reads all incoming messages and delivers only those the user wants.

Retrieved information is stored in the form of "books," which mimic their paper prototypes right down to their tables of contents and dogeared pages. While the data sources may reside in different locations and on different hardware platforms, the books that collect them make everything appear local. And users can customize their desktops to model their own information-retrieval preferences, so there's still fewer old habits you have to break. Prices start at $10,000 for five clients the first year, with subsequent discounts. For information, call 919 677-8000. ■

DATA, DATA EVERYWHERE

Sybase Inc.'s Warehouse WORKS for client/server should appeal to anyone struggling to manage diversity—data diversity, that is. Data, after all, lives everywhere—on the mainframe, on client/server systems, in departmental servers—and the trick is to offer transparent access to all those heterogeneous neighborhoods.

Warehouse WORKS accomplishes that through Sybase's Enterprise Connect interoperability architecture, which enables users to assemble information from sources, including IMS, VSAM and IDMS on the mainframe; and Oracle, Informix, Rdb and AS/400 in departments and distributed sites. Key third-party warehousing products are built on the company's Open Serve API, leveraging its open infrastructure to build customized warehouse functions that link together.

To ensure data consistency and quality, the Enterprise Connect architecture offers the Replication Server and InfoPump, which contain scripting facilities for specifying data transformations. The product also enables selective distribution of data at chosen intervals to heterogeneous sources and the ability to package information to satisfy specific needs, as well as high-speed data delivery for multiple users from any tool. For information, call 800 8-SYBASE. ■

> **"Congress and federal managers remain information poor, severely lacking in reliable data with which to measure the costs and results of agency operations."**
>
> *–Charles A. Bowsher*
> *Comptroller General of the United States*

SEEK AND YE SHALL FIND

When employees at E-Systems Inc. noticed they were spending 80 percent of their time tracking down information and just 20 percent analyzing it, the company decided to take the expertise gained over decades of developing defense applications and unleash it on the problems of corporate intelligence gathering.

E-Systems' ECLIPS might be considered the omniscient Oz of competitive intelligence. The system provides desktop access to virtually any source of internal or external business information, from sales-meeting notes to electronic news feeds. Paper documents can be scanned into the system, which also accepts CD-ROMs, electronic publications and the results of subscription database searches.

Users can search any number of sources simultaneously by typing a single query. In a matter of minutes or even seconds, the system searches the ECLIPS index and responds with a list of headlines and their sources ranked according to relevancy. Clicking on a headline brings up full text, which the user can either print or copy to a word-processing application. ECLIPS also acts as an electronic clipping service, automatically e-mailing users information that matches their interests.

The product features systemwide security, monitoring of data usage and copyright compliance. The system, which starts at $50,000, operates in a multiplatform client/server environment and can be fully integrated with existing desktop computers, networks, e-mail and data sources. For more information, call 214 205-7959. ■

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Conference
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PETER SENGE

The Challenge for Fundamental Change

■■■

Myers-Briggs Personality Types

PLUS:

New Business Strategies — New IT Opportunities

Think Global, Implement Local

Assumptions for the Digital Economy

The Sociopathology of the Internet

THE PSYCHOLOGY OF IT: THE CIO'S NEW MIND SET

OCTOBER 15–18, 1995 ■ HYATT GRAND CYPRESS ■ ORLANDO, FLORIDA

Jim Wetherbe
Conference Moderator

Peter Senge
Keynote Speaker

Don Tapscott

Patrick Zilvitis

The Psychology of IT: The CIO's New Mind Set

OCTOBER 15–18, 1995 ▪ HYATT GRAND CYPRESS ▪ ORLANDO, FLORIDA

Change and growth, personal and professional, is everywhere and constant. And resistance is continuous. As the nature of IT has changed so radically over the past five years, so have the requirements for being a successful CIO.

These include coaching rather than managing, and establishing your IT division as a business unit; in short, changing your thought processes, your personality and your communication skills.

The Psychology of IT brings together visionaries such as the CEO of the Center for Applications of Psychological Type (the not-for-profit center that compiles Myers-Briggs Type Indicators research), and the vice president of People Systems from Saturn Corporation with the Chief Visionary of First Virtual Holdings Inc. Our roster also includes the CIOs of Allstate Insurance Company, VeriFone, Owens-Corning Fiberglass and The Gillette Company. They, along with Peter Senge, author of *The Fifth Discipline* and co-author of the recently released *The Fifth Discipline Fieldbook*, will discuss new ways of thinking and managing that have allowed their organizations to thrive.

You will hear how you can:

- Change your "mental model"
- Learn how to facilitate communications and "share" information with every individual in the corporation
- Understand your personality type and how it affects your business transactions
- Apply a variety of non-traditional management practices
- Use electronic marketing delivery systems and investigate the sociopathological issues of the Internet

"Rarely does sharing information change mental models and lead to fundamental improvement in business operations," says Peter Senge. CIOs need to learn that sharing actionable information can lead to increased success in business.

Dr. Jim Wetherbe, Director, MIS Research Center, University of Minnesota, and Federal Express Professor of Excellence and Director, Center for Cycle Time Research, University of Memphis, will again moderate the *CIO Perspectives* program and set the stage for our discussions.

So join us, October 15–18, in Orlando and learn how to adapt to a rapidly changing business climate in an environment where technology's advances are measured in weeks, not years.

COMPANION PROGRAM

Participation in the companion program includes all scheduled receptions, meals and entertainment. Companions must be enrolled in the program for involvement in any conference-related activities. The companion program does not include conference session attendance.

PROFESSIONAL SESSIONS

On Monday afternoon, for those of you who do not play golf or tennis, there will be several professional sessions available. There is no additional fee for these sessions.

FEATURED PRESENTERS

JERRY MACDAID
CEO
Center for Applications of Psychological Type

R. TIMOTHY EPPS
Vice President of People Systems
Saturn Corporation

WILL PAPE
CIO
VeriFone, Inc.

PATRICK J. ZILVITIS
Vice President
Corporate Information Technology
The Gillette Company

DON PEPPERS
President
Marketing 1:1

FRANK POLLARD
Senior Vice President & CIO
Allstate Insurance Company

MICHAEL RADCLIFF
Vice President & CIO
Owens-Corning Fiberglass

EINAR STEFFERUD
Chief Visionary
First Virtual Holdings Inc.

DON TAPSCOTT
President
New Paradigm Learning Corporation

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Howard G. Pollitt
Metropolitan Life Insurance Company

"This conference was the best consolidation of ideas and reporting on actions taken that I've ever been to."
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CIO PERSPECTIVES

The Psychology of IT: The CIO's New Mind Set

Sunday, October 15–Wednesday, October 18, 1995
Hyatt Grand Cypress ■ Orlando, Florida

Please print and complete this form in its entirety, then forward to the attention of Executive Programs. **Fax** *to 508-879-7720.* **Call** *us at 800-366-0246.* **Mail** *to: CIO Communications Inc., 492 Old Connecticut Path, Framingham, MA 01701.*

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○ **IS Practitioners/Executives**
If you are a CIO, IS executive or hold another executive position, the fee is **$1,395**.

○ **Government/Military**
The fee, which includes your hotel for three nights, is **$1,695**. Do not make your own hotel reservations. **CIO** will make them for you.

○ **Sales/Marketing/Consulting**
If you hold a sales, marketing or consulting position, the enrollment fee is **$5,000**. **CIO** will make the final determination of this category.

OTHER ACTIVITIES

Monday afternoon activities include:

- ○ Golf Tournament: **$125**
  Golf must be prepaid
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  ○ *Club rental*
  ___ *Left-handed* ___ *Right-handed*
- ○ Tennis Tournament: *Complimentary*
- ○ Splendid China Tour: **$37**

○ **COMPANION PROGRAM ($199)**
Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, entertainment, morning stretch and companion get acquainted breakfast. Conference session attendance not included.

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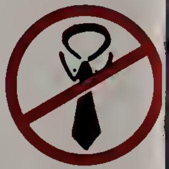

ATTIRE
Casual! Please, no suits, ties or business attire!

HOTEL ACCOMMODATIONS
A block of rooms has been reserved at the Hyatt Grand Cypress. We urge you to make your reservations early by calling the hotel at 800-233-1234. Be sure to identify yourself as part of the **CIO** *conference to receive the conference rate. Please make your reservations early. All unreserved rooms will be released on 9/20/95. Hotel reservations/cancellations and charges are your responsibility.* **CIO** will make hotel reservations for government/military participants.

TRANSPORTATION
American Airlines is the official conference carrier. Call American at 800-433-1790 and reference Star File #S3905D5. AVIS is the official car rental provider. Call AVIS at 800-331-1600 and reference B766657. Shuttle bus transportation is available from Orlando International Airport at the rate of $23 round trip.

ENROLLMENT FEES
All enrollment fees must be paid in advance of the meeting. *Fee includes conference sessions, concurrent sessions, corporate host displays, conference materials and scheduled meals. Transportation, hotel and recreation are your responsibility.*

CANCELLATION
You may cancel your enrollment up to 10/9/95 without penalty. NO REFUND OR CREDIT WILL BE GIVEN FOR CANCELLATIONS RECEIVED ON OR AFTER 10/9/95. You may send a substitute in your place.

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TRENDLINES

THE KNOWLEDGE ENTERPRISE

CLARIFICATION

In a March 1, 1995, article, "Everything You Need to No," we discussed how to tactfully and tactically deal with user IT requests that, for whatever reason, are not able to be met. In that article we ran "No-Brainers," a top-10 list of the strangest user requests of all time. Though the list was meant to be humorous and unscientific, several of our non-IS readers pointed out that given the right circumstances, most of these requests could be considered downright reasonable. Further, off-hand lists like this could foster a stereotype that users, in one reader's words, are "naive, spoiled children who ask for everything that tickles their fancy." At this magazine, we have worked hard to promote understanding between IS and the user community and help eliminate such stereotyping. We apologize if "No-Brainers" hindered this understanding in any way.

OBJECTS OF DESIRE

If you love your end users, set them free. That's the message from IRI Software, whose new product, ExpressView, enables users to access, analyze and share business intelligence without the help of the IS department.

The product, an object-oriented groupware tool for online analytical processing (OLAP), allows business users to build their own interactive "briefings" using "data-smart" objects including tables, graphs and data selections. ("Data-smart" objects, according to IRI, are linked to live, multidimensional datasets and are aware of how to operate on them.) Users can navigate and report on all types of organizational information, including products, time periods, markets and financial accounts. Then, once they have built their briefings, users can share them across networks using any standard e-mail product.

ExpressView is aimed at both experienced analysts and novice users, for whom developers can set up "briefing books" to make information access easier. It also supports Microsoft's Object Linking and Embedding (OLE) 2.0, so users can provide senior management with complete briefings—including supporting documents, spreadsheets, presentations, multimedia and other files from OLE-compatible Windows applications.

The price is $1,295, including a single-user version of the Express OLAP engine. For information, call 617 672-4698.

THE DIGITAL DOORSTEP

Just think of your desktop as a doorstep with thousands of newspapers, magazines and wire-service feeds being tossed on it daily, and you'll have some idea of the scope of Reuters Business Briefing, an information tool from one of the best-known names in the news biz. Available in a standalone Windows format or in a networked version for the enterprise, Business Briefing enables users to access the latest headlines, full-text stories and financial market information from the company's own news-gathering network, in addition to more than 2,000 other sources. Users can search by company, industry, country, region, proper name, date or context: Historical information can be pulled from a five-year archive of news stored in the company's worldwide information database.

Also new from Reuters is the Business Alert Server, a networked tool that provides enterprisewide access to the same database as Business Briefing but also automatically delivers business intelligence tailored to the company's needs. Used in conjunction with Lotus Notes, Business Alert enables organizations to assemble and collate intelligence in one location and share it in a variety of ways among work groups. For information call 212 603-3850.

STOCK MARKET CRASHES. FILM IN 10 MINUTES.

For two years, the Dow Jones Investor Network (DJIN) has been delivering market news to businesspeople on their desktops. But with 10 hours of programming available every day and a broadcast schedule subject to change as stories break, knowing just when to tune in for that critical press conference or congressional hearing isn't always easy.

To help solve the problem, the Dow Jones News Service (Dow Jones' financial and business news wire) has begun publishing content alerts throughout the day, which appear onscreen as a text headline about 10 minutes before each video event. The news-alerting system enables users to more closely track the service's broadcast schedule and to set "filters" specifying what types of events they want a heads-up on (for those interested in what Michael Dell but not Michael Ovitz has to say, for example).

The DJIN delivers proprietary interviews, press conferences, corporate presentations, economic indicators and analysis and other potentially market-influencing news and information. Programming can be displayed on the user's monitor without affecting other PC applications. For information, call 800 416-DJIN.

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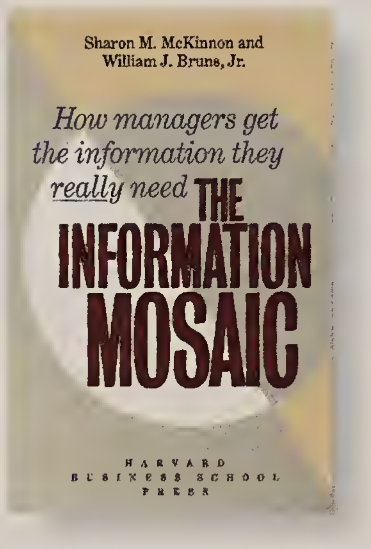
INFORMATION BOOKSHELF

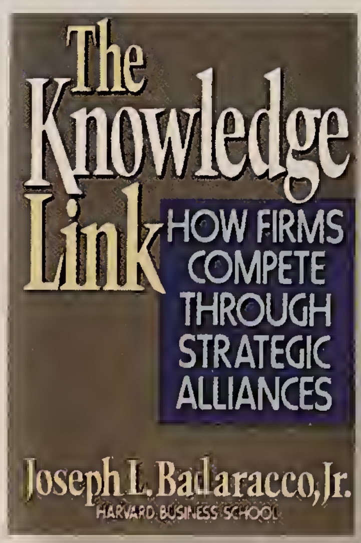
As academics and business practitioners increasingly look upon information as a worthy topic in and of itself, volumes dedicated to the subject have started to proliferate. So, for those who—having already consumed the works of the Peters Drucker and Senge—are still hungry for more, here's a short list of good titles.

The Information Mosaic (Harvard Business School Press, 1992) has been around for a few years now, but it's still a standout.

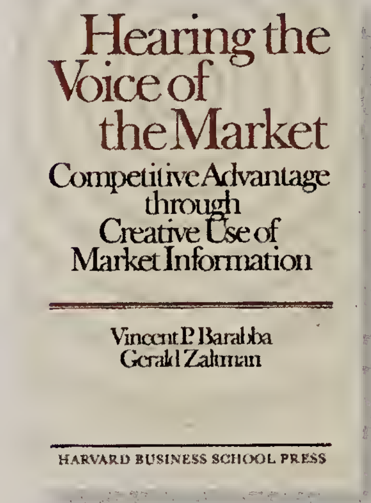

Sharon M. McKinnon and William J. Bruns, Jr.
How managers get the information they really need
THE INFORMATION MOSAIC
HARVARD BUSINESS SCHOOL PRESS

Rather than sprouting guru wings and fluttering away into the management-theory firmament, authors Sharon M. McKinnon and William J. Bruns stay grounded in the experiences of 73 manufacturing-company managers, whom they interviewed exhaustively about their information habits. The authors distinguish between what people are generally assumed to do and what they actually do: In almost every case, formal systems of information delivery (through financial data and paper reports) play serious second fiddle to personal information systems that rely on physical counts and informal communication. The study on which this book is based was sponsored by the Society of Management Accountants of Canada, but the results speak powerfully to IS organizations.

While *The Information Mosaic* takes a micro approach—looking at how individual managers use information in specific day-to-day activities—Joseph L. Badaracco Jr. is concerned with information generation and management on a global scale. In *The Knowledge Link: How Firms Compete through Strategic Alliances* (Harvard Business School Press, 1991), Badaracco posits two types of knowledge: *migratory*, which travels easily among people or organizations (in books, formulas and machines, for example); and *embedded*, which resides in specialized relationships among individual people or groups. The way to capitalize on both types of knowledge, this elegantly written book argues, is through strategic alliances that offer not just the immediate gratification of a plugged product hole but also the long-term benefits gained from learning how the other guy does things. Focusing on the many and varied alliances of General Motors and IBM, Badaracco describes how truly strategic partnerships pay off in expertise and market strength, without drowning the firm's unique identity in a sea of complex relationships.



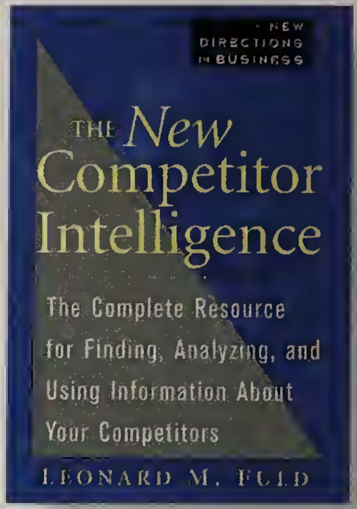
Back inside the corporation, Vincent B. Barabba and Gerald Zaltman examine various dysfunctional behaviors that prevent managers from successfully understanding and applying crucial customer data. In *Hearing the Voice of the Market* (Harvard Business School Press, 1990), the authors argue that shortsighted formal research efforts, lack of institutional memory and, ironically, changes in IT that allow managers to more easily access—and misinterpret—data have contributed to shoddy information use in many companies. In addition, the practices of contracting out research and of treating market research staffs as vassals of the marketing organization have tended to ghettoize the whole information-gathering function.


Hearing the Voice of the Market
Competitive Advantage through Creative Use of Market Information
Vincent P. Barabba
Gerald Zaltman
HARVARD BUSINESS SCHOOL PRESS

The authors' solution is embodied in the *inquiry center*: a model for weaving together all of a company's information and integrating it into the decision-making process. Explicated in diagrams and text, the inquiry center is a manageable metaphor for what often seems an unmanageable task.

Go ahead and clear a space on your desk for Leonard M. Fuld's *The New Competitor Intelligence* (John Wiley & Sons, 1995) because you're going to want to keep it within easy reach. This is one of those volumes that's destined to become dog-eared, not just because it offers a blueprint for creating a corporate business-intelligence system (although it does that, too) but because it devotes more than 200 pages to sources: online, in print and in government agencies and private organizations.

Take, for example, the Association of Independent Corrugater Converters, a trade group for the box industry that can help you suss out your competitors' principal container suppliers and learn how much product they're shipping. Or *Trustees of Wealth*, a popular fund-raiser's tool that also contains thousands of biographies of foundation trustees (who, not coincidentally, are often senior executives at major corporations).


NEW DIRECTIONS IN BUSINESS
THE New Competitor Intelligence
The Complete Resource for Finding, Analyzing, and Using Information About Your Competitors
LEONARD M. FULD

The New Competitor Intelligence doesn't just talk about information; it delivers it in truckloads. As such, it is a valuable resource for executives, market researchers, journalists, and anyone else who knows the answers are out there but isn't quite sure where *there* is.

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4

WHAT TO DO IF YOU'VE GOT ALL THE INFORMATION IN THE WORLD.

Just when you thought you already had all the data your existing information system could possibly handle, another whole carload comes along. It doesn't matter why it happens; it happens. You merge. You move to client/server. You decide to add a new application. You grow. Don't worry. Digital's new AlphaServer™ family is arriving right on time. Offering affordable, high-performance

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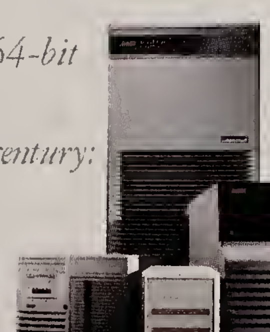

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International Studies

Companies venturing into foreign markets have some serious homework ahead of them

BY THOMAS J. HOWARD

Have you ever heard an American automobile manufacturer complain that it can't sell cars in Japan? If you haven't been on Mars for the last 20 years, you know the spiel: The market is closed, inaccessible to foreign manufacturers. Yes, it's true that Japan's trade practices make it tough to penetrate the market there. And yet, the largest-selling luxury car in Japan is the Mercedes-Benz, which is made in Germany.

Why has Daimler-Benz succeeded where others have failed? One reason is that the company asked the right questions. It found that cars in Japan have steering wheels on the right-hand side. It found a demand for relatively small cars. It found that the manufacturer—not the distribution channel—creates demand for the product. In short, it found a blueprint for success—and then followed it.

This is not rocket science; none of this information is exactly esoteric. In fact, American automobile companies knew these facts as well as Daimler-Benz did. But they didn't act on them and, as a result, their cars sold poorly in Japan. Today, the Big Three all make cars with steering wheels on the right-hand side and—no surprise—their collective Japanese market share has risen substantially.

Success in an international venture depends upon a company's willingness to ask the right questions, seek answers from the best sources and then take action based on those answers. Americans' experiences in the Japanese auto market demonstrate a failure to perform the last of these steps. The rest of this article examines how to succeed in the first two.

Knowing what questions to ask may sound simple at first, but if you are going to venture outside your home territory you will have to consider more—and often more-complex—issues. You need to look not only at what to sell but also where and how to sell it. For example, can an American company legally sell products in North Korea? (No.) Can you repatriate your profits from operations in Russia? (Very carefully.) Can you sell a product with the word "diet" in its name in a convenience store in Japan? (No, "diet" products are sold in pharmacies. Diet Coke is called Coke Light in Japan.) Can you change distributors in Brazil? (If you didn't set it up right in the first place, almost never, and never without huge costs.)

I think you get the message. Check out the local rules. Find out the product and service requirements in the market. Dig deeply into the distribution laws. Look at the impact of trade initiatives like NAFTA and GATT. In short, ask the right questions.

After you have the right questions, where do you go to get answers? You will probably want to gather two types of information: primary (the information you get directly from the source—potential customers, distributors, competitors and local-market

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pundits) and secondary (data gleaned from research firms, online databases and published materials). Each has its place and specific purpose.

In the world of international business, primary research is usually the better starting point. Networking with people in your industry who are doing business in the target market is a great way to get a feel for what is going on there. It is, however, time-consuming and expensive. And if language is a problem, you may need an interpreter. If you are considering entering a large or sophisticated market where decisions made early in the process will have a long-term impact, spend the time and the money to do it right.

You also may want to engage a research or consulting firm to do more-formalized primary research. Use local focus groups to test product or marketing concepts. Use phone surveys to get the answers you need. A note of caution: Just like products, all research tools do not work well in all markets. For example, focus groups are very difficult to manage in Japan, where people do not feel comfortable expressing opinions in a group. Phone surveys don't work in China, because so few people have phones.

Secondary research allows you to get information—some of it free—that is usually more quantitative in nature. Go to the public library and ask the reference desk to help you find your answers. Go to government sources: The U.S. Department of Commerce has volumes of information (much of it free and some of it actually useful), and most state governments have departments devoted to export trade. In addition, trade associations usually collect information about foreign markets, which is all the more valuable for being industry specific. And don't forget to pick up newspapers and other periodicals when you travel (and remind your colleagues to do the same) to find out what is going on in the business world from the local perspective.

Organizations you deal with in other capacities may also provide some valuable insight. Your banker may be very helpful in investigating financial alternatives. Your accounting firm will have tips about the tax rules.

Ultimately, you will have to spend money to buy some good secondary information. Check with the research or consulting firms you use here to see if they have an office in your target market. Ask your contacts for names of good, local research sources and look for other names in published articles. Some large, global firms like Gartner Group, Dataquest, IDC and Nielsen can be very good, but be sure to check out their capabilities in the market you want to enter. Never, ever rely on one source for information. Every source, whether secondary or primary, has a bias.

Check out the international newsgroups: Much of the information you gather there will be anecdotal, but it can still be useful.

Information technology can also contribute significantly to your research efforts. Commercial online services such as CompuServe, America Online and Prodigy as well as Lexis-Nexis make volumes of information available at the touch of a key. The Dow Jones News/Retrieval service provides access to hundreds of publications such as *The Wall Street Journal* and *Business Week*. Dun & Bradstreet maintains a massive database with loads of useful information that is available through an online service. Be careful: The costs for these services can add up quickly.

Don't overlook the thrills of surfing the Internet. Use the World Wide Web to look up the home pages of your competitors (many foreign companies have home pages in English). Check out the international newsgroups: Much of the information you gather there will be anecdotal, but it can still be useful.

Electronic "clipping services" are an efficient way to get answers to your questions without being deluged with irrelevant information. These companies periodically (you set the period) poll their databases and send you references to articles on subjects you determine in advance. One such service, First! from Individual Inc., draws on a wide range of sources pertinent to international business, including *Eastern European Business Law, Korea Economic Daily* and *Business Latin America*. Dow Jones, Lexis-Nexis, NewsEdge from Desktop Data Inc. and NewsHound from Knight-Ridder Inc.'s *San Jose Mercury News* offer similar services.

As you already know, IT can provide you with an abundance of data whenever you want it. The real challenge is to transform that data into useful information. Applications like Lotus Notes provide excellent tools to manage, store and retrieve all that stuff you just paid a zillion dollars for. Most research companies have a Notes front end. These agents usually replicate a portion of the database on your Notes server, so you can easily access the piece you buy. Certainly any information you receive electronically can be placed in a Notes database. If you have important information in hard copy, get a scanner and put it in electronic form.

Let me leave you with some suggestions that will help you make your research decisions. Create a plan that describes what you want, when you want it and how much you are willing to pay for it. Know in advance what questions you should ask. Use multiple sources of both primary and secondary information. Apply technology to make the process easier and the information more useful to more people. And don't forget, in international ventures, more than most, assumptions can be dangerous.

Thomas J. Howard is senior vice president, international, at Tricord Systems Inc., a server manufacturer in Plymouth, Minn. His book Global Expansion in the Information Age: Big Planet, Small World *was published by Van Nostrand Reinhold.*

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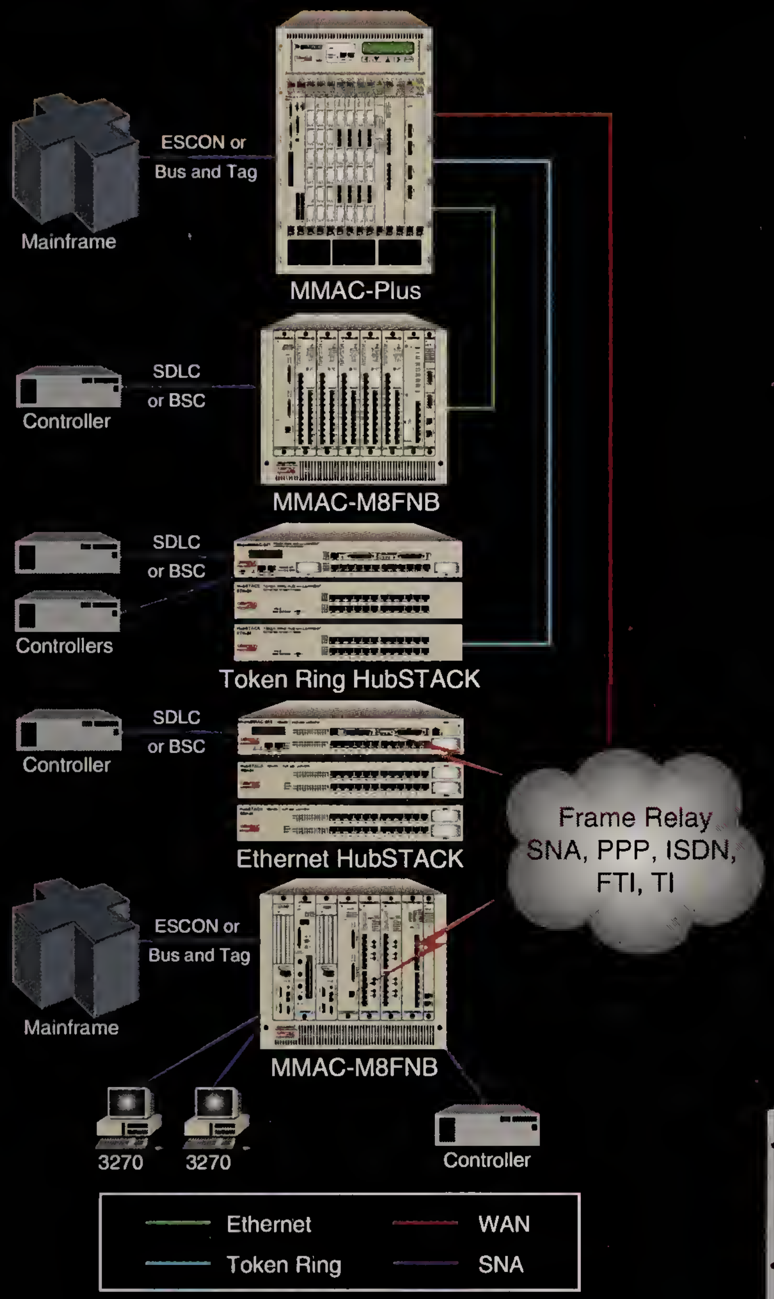

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Client/Server Everything

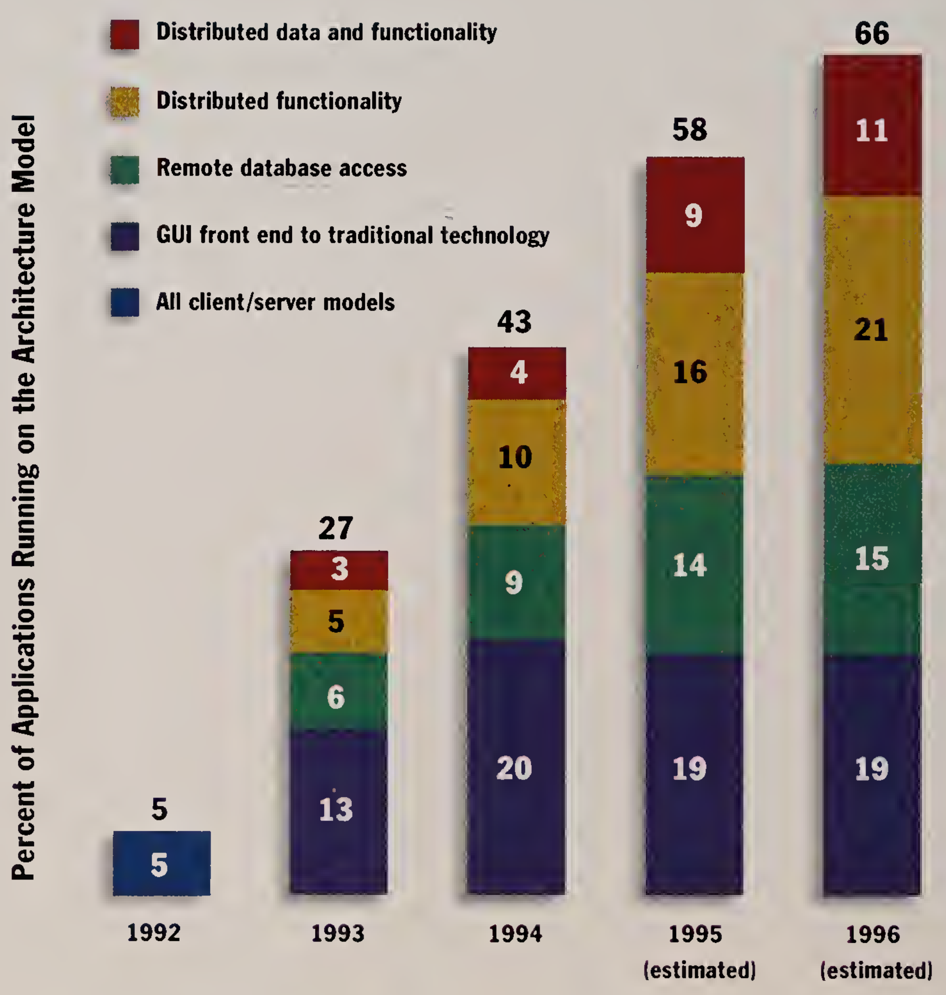
A survey of top IS executives shows that the client/server revolution sends ripples in all directions

BY JEFFREY PLEWA and STEVEN PLISKIN

For the past seven years, the Information Technology Consulting Group of Deloitte & Touche LLP has surveyed U.S. and Canadian CIOs to track their plans and get a sense of some general trends. This year, nearly 400 executives responded to the survey—which, not surprisingly, showed substantial increases in the use of client/server applications and business-process reengineering (BPR).

To review the results of the survey and gain additional insights, Deloitte & Touche assembled a representative panel of respondent CIOs, who met in Chicago in April to discuss a range of issues. In attendance were Donald Hollis, executive vice president of First Chicago Corp.; Robert Musacchio, senior vice president and CIO of information services at the American Medical Association; Richard Golden, director of information systems at Mesirow Financial; Riz Shakir, area vice president of research and development with System Software Architechture; and John Tyler, senior vice president and chief technology officer at Houghton Mifflin Co. What follow are highlights from the survey, buttressed with observations made by this panel of executives.

Client/Server Applications By Architecture Model, 1992-1996



CHARTS BY CHRISTINA WILLIAMS

When it comes to information-management initiatives, the buck clearly stops with the CIO. However, as information increasingly becomes the lifeblood of an organization, and solutions call for enterprisewide implementation, creating applications to serve the whole organization becomes more complicated. The role of the CIO remains highly political and demands that he or she not only understand the future benefits of technology solutions but also be able to articulate them in a way that departmental executives can embrace and translate to their staffs.

At the heart of today's most often articulated solutions is the client/server architecture. About 90 percent of all CIOs say their expenditures on client/server projects will increase significantly or somewhat during the next two years, particularly in the banking and financial services industry. While larger companies expect to invest more in the client/server arena, even companies with revenues of less than $100 million foresee a sizable increase in their investments in this hot-button technology.

The survey revealed that the use of a client/server architecture has risen about 60 percent in the past year, from 27 percent of all applica-

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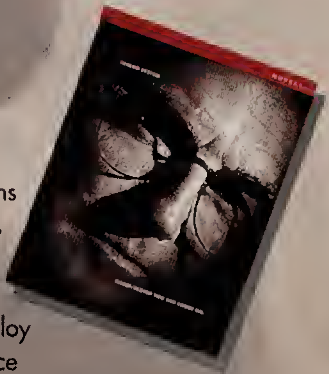

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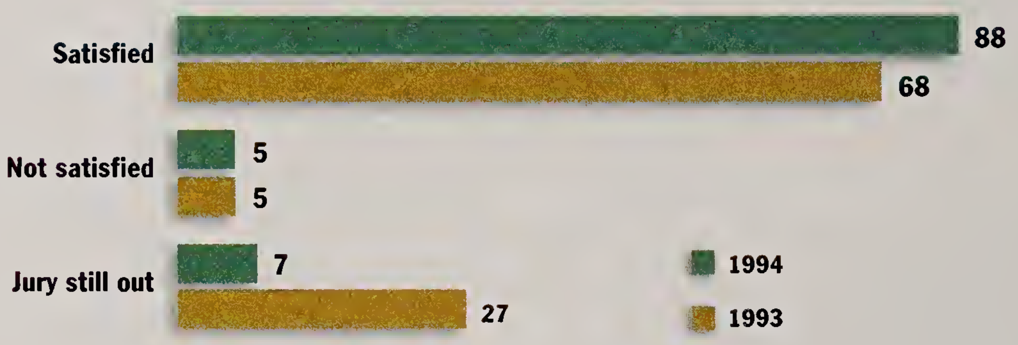
Assessment of Business-Process Reengineering Results

Percent of Respondents Assessing Results



tions in 1993 to 43 percent in 1994. Moreover, CIOs are gradually making use of more-advanced architectures—distributed data and functionality (see chart, Page 30)—rather than standing pat with such "ground floor" C/S strategies as remote database access and GUI front ends to traditional technologies.

Nonetheless, between 1993 and 1994, the gap between actual and perceived benefits of using client/server tools continued to widen. According to respondents, the major challenges they face are reducing development time for creating applications, enhancing system quality, reducing maintenance costs, improving performance and improving documentation. Among obstacles to implementation, the two most frequently cited by respondents were the complexity of the multivendor environment and the lack of qualified personnel skilled in the use of client/server tools.

As a possible remedy to the latter, First Chicago's Donald Hollis believes object-oriented development techniques could substantially shorten the front-end development process. He also sees parallel processing as a particularly powerful alternative mainframe, offering good price/performance levels and suitability for client/server architectures.

According to System Software's Riz Shakir, current client/server solutions are still in the technology's first generation. What is needed for second-generation manifestations, he says, is intelligence in both the client and the server—which he identifies as a "peer-to-peer environment." These tools are just emerging, Shakir notes. "They come after the need has been there a year or two; until then, we end up making do with pieces of tools. We need the more-advanced tools."

The AMA's Robert Musacchio notes that over the past couple of years, "new developments in client/server have been departmental in nature and not enterprisewide. Unfortunately, each time you roll out a new system, it's like a baby taking a new step."

The lack of focus on infrastructure costs was also observed by panelists. Hollis says that, historically, the costs of middleware, servers, communications and help desks have not been properly factored in. "We need crews of people to fix the thousands of devices that are part of a wide area network," says Hollis. "It's not like it was when there was just a PC. A lot more maintenance and training is needed. Anything done centrally had economies of scale. But in Chicago, we are spread over 11 buildings, and just keeping track of inventory and the release level of software is massively more difficult."

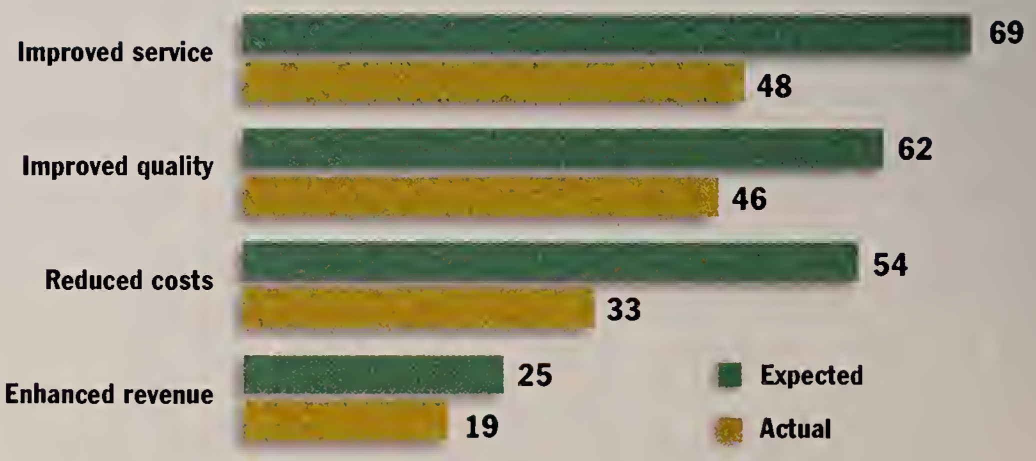
Although client/server is definitely the architecture of choice for new enterprisewide solutions, legacy systems still account for nearly three-quarters of all mission-critical systems. (Interestingly, more than one-third of respondent CIOs are satisfied with their legacy systems, despite the fact that 71 percent cited a lack of access to management information as a problem.) Not surprisingly, the major obstacle to replacing legacy systems, noted by 74 percent of CIOs in 1994 (up from 69 percent in 1993), is the cost. However, about two-thirds of the CIOs do expect to replace their legacy systems with commercial packages rather than custom-developed systems.

Are such legacy-replacement packages out in the marketplace yet? Musacchio notes that some are now available in the financial-applications arena. However, he expects that any packages the AMA needs will require a high degree of customization.

Mesirow's Richard Golden believes that vendors are bringing out increasingly mature and stable client/server packages, for which extensive modification is not needed. He says his firm is implementing

Expected and Actual Benefits of Business-Process Reengineering

Percent of Respondents Rating the Benefit as Significant



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packages for financial accounting systems and portfolio management without a high degree of customization. "Products coming to market have built-in flexibility. Such flexibility is part of the tools." In fact, Mesirow is replacing its legacy systems with more-robust client/server systems.

Although outsourcing finds more acceptance among CIOs, it does not appear to be a major option for replacing legacy systems. The survey revealed that only 26 percent of respondents in 1994 (up from 24 percent in '93) view application development as an outsourcing option.

Business-Process Reengineering

As in past years, BPR continues to rank high as a focus of attention among CIOs. On average, the Deloitte & Touche survey found that companies launched 3.8 BPR initiatives in 1994, up from 3.2 projects in 1993. While 88 percent of the respondents report satisfaction with their BPR projects (up sharply from 1993's satisfaction level of 68 percent), expectations for improved service, improved quality, reduced costs and enhanced revenues still lagged behind actual benefits (see charts, Page 32). The survey also concluded that technology efforts involving BPR are more successful than technology initiatives that do not involve BPR, and that networking and client/server architecture are the two most important technology components of a company's BPR efforts.

The most important contributors to the overall business success of BPR are the presence of a strong champion or executive sponsor and an effective project-management team, according to the respondents. When asked who should lead the BPR charge, 96 percent of CIOs responded that non-IS management should either lead the effort or be part of a team that also includes information technology management. Sixty-eight percent also think that the ideal project-management group is a cross-functional team cosponsored by IS and business management.

Houghton Mifflin's John Tyler says his company "achieved some expected benefits on smaller projects. There is a steep learning curve on processes that cut across the corporation. [Implementation] took a good deal longer than we expected and required more resources" than anticipated to conclude projects. Although Tyler believes BPR activities should be led by the relevant business units, he notes that "on a corporatewide basis, no one business unit [makes decisions]. IT is ultimately the enabler and implementer of change." The key to organizational understanding, according to Tyler, is better communications; and it is the responsibility of the business-unit executives to communicate the benefits of BPR to their people.

Despite their own slightly improved job security, CIOs continue to have problems finding qualified staff for certain key positions—particularly client/server technical architects and distributed-database experts.

The most significant obstacles to BPR success cited were organizational resistance to change (82 percent), inadequate executive sponsorship (72 percent), unrealistic expectations (65 percent) and inadequate project management (54 percent).

The CIO Role and IS Staffing

In a positive note on the perennially negative theme of CIO turnover, the Deloitte & Touche survey found that turnover has dropped from 17.5 percent in 1992 and 18.8 percent in 1993 to 15.5 percent in 1994. About 75 percent of respondents describe themselves as career IS professionals who have been with their companies for an average of 11 years.

Despite their own slightly improved job security, CIOs continue to have problems finding qualified staff for certain key positions—particularly client/server technical architects (cited by 79 percent) and distributed-database experts (72 percent). Hollis notes that First Chicago is now working on developing a career track that would reward and compensate IT staff for better performance in the mentoring, consulting and teaching skills that are necessary in today's IT environment. Hollis says his company expects to roll out a program of reward and recognition for such skills this summer.

Other Noteworthy Survey Findings

- IT budgets increased by an average of 3.5 percent in 1994, while the Consumer Price Index went up by only 2.7 percent.
- Over the past three years, the willingness of information executives to outsource key functions has grown consistently. The three most often outsourced functions in 1994 were disaster recovery (59 percent, up from 45 percent in '93); data entry (32 percent, up from 26 percent); and application development (26 percent, up from 24 percent).
- Despite fairly broad recognition of the importance of integrating systems across international operations, progress toward achieving that goal has been slow. Some 50 percent of respondent CIOs said international integration was very important (up from 46 percent in '93). But only 17 percent claimed to be highly integrated; and 59 percent were minimally or not at all integrated.
- Survey respondents reported 3 percent of their IT budgets is allocated to training. Health-care respondents spent the most on training (4.2 percent), while banking and financial services firms spent the least (1.9 percent). CIO

Steven Pliskin and Jeffrey Plewa are principals with Deloitte & Touche LLP management consulting in the Systems Integration Center of Expertise in Chicago.

A SPECIAL REPORT SUPPLEMENT

INFORMATION TECHNOLOGY AND THE BOTTOM LINE

THE FW/CIO QUARTERLY

Corporate Treasure Maps

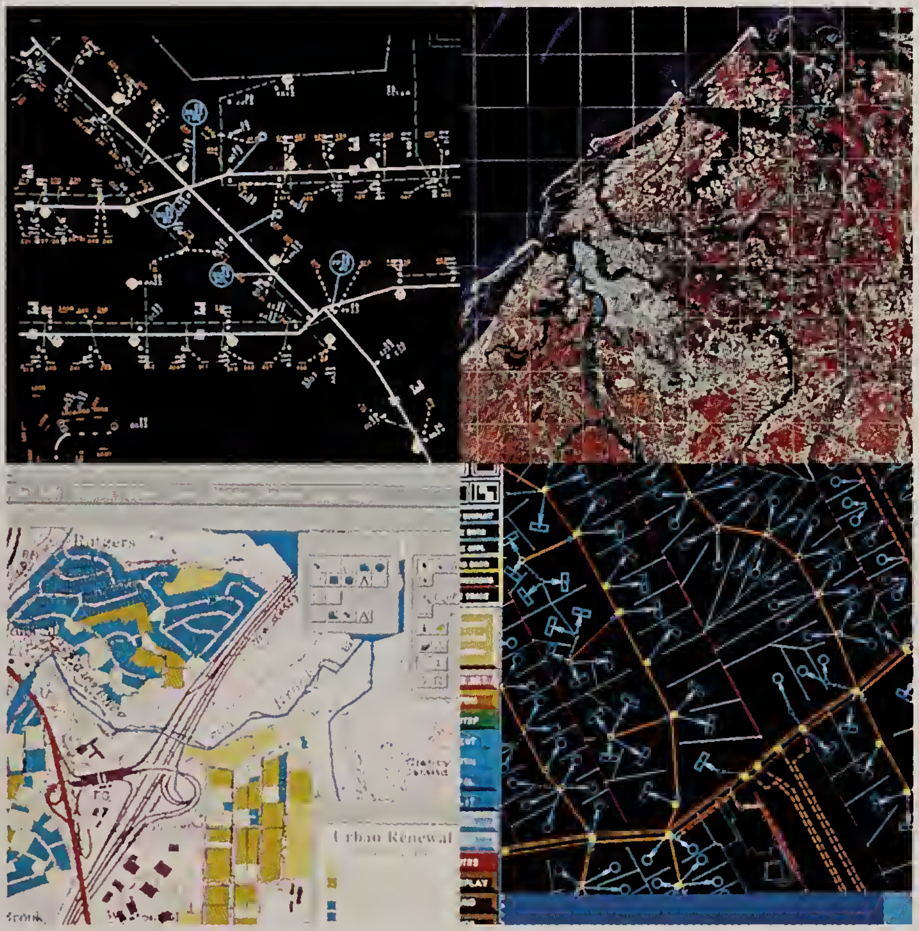
The days of sticking colored pins in wall maps are numbered.

by Srikumar S. Rao

Your company is growing. Potential customers abound, and your salesmen are exploring undiscovered territory. They're sending back more and more information to headquarters, and you've got to figure out how to digest it all. What to do?

Within the last few years a new technology has started gaining acceptance that dramatically enhances the ability of a business to use huge and ever-increasing amounts of data in powerful new ways. It can radically alter the performance of a wide range of company activities from site selection to market segmentation to sales force distribution.

Known as geographic information systems—GIS for short—the technology involves a digitized map, a powerful computer and software that permits the superimposition and manipulation of various kinds of demographic and corporate data on the map.



It has been used for decades by energy companies, utilities, railroads and governments to plot pipeline routes, track population movements, map the mineral content of geologic formations and the like. But now that workstations and desktop computers are becoming so enormously powerful, GIS is moving into the business trenches.

"Eighty-five percent of all data has a geographic component," says Mike Marvin, chairman of MapInfo, a GIS firm based in Troy, N.Y. That includes virtually anything having a spatial or temporal relation, from boxes in an organizational chart to time lines of a manufacturing processes to addresses of major customers.

"The business problem has changed from too little data to too much data, data that is poorly understood and rarely used," says John Antenucci, president of PlanGraphics, a GIS consulting firm based in Frankfort, Ky. "The most significant benefit of GIS may be its ability to take the results of an analysis and display them in a visually powerful way. It is a great tool for conceptualizing and analyzing relationships between data sets that previously remained separate."

To comprehend just how thoroughly GIS can change the way a company handles data, consider the case of Whiteco Outdoor, a PlanGraphics client in Merrillville, Ind. The $100 million-in-revenues division of Whiteco Industries owns and operates 20,000 billboards nationwide.

The heart of billboard sales is the marketing proposal made to prospective advertisers. In the past, the salesperson would take a map of the area where the prospect did business, laboriously stick on colored dots indicating the location of proposed billboards and try to explain what it all meant to the customer. Questions about alternate con-

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Eyes in the Sky

High-resolution photography from space-based satellites used to be a tightly controlled military technology. With the easing of Cold War tensions, the U.S. government now permits commercial use of pictures with a resolution of up to one meter, which is sufficient to distinguish a large dog.

Geographic Information Systems based on satellite photography have enormous potential. Power companies can use them to develop optimal transportation and utility systems and to manage their grids. Telecommunications companies can use them to select the best locations for their cellular sites. Tax assessors can determine the nature of additions put in and whether they are unauthorized. The mining industry can look for mineral deposits associated with small geological formations. Farmers can monitor crop production and know the precise contours of pest infestations. Construction companies can decide the best route for pipelines and roads. The list is endless.

"High-resolution aerial photography will run you $800 to $1,000 per square mile and it could take four to 18 months for the data, converted into maps, to reach you," says John Neer, president of Thornton, Colo.-based Space Imaging. "Satellite photography will cost you a half to a tenth as much, and it's better. Our satellite can record a 60-square-mile area, at one-meter resolution, in 2.5 seconds. Digitized processing ensures that you get maps in minutes or hours."

Space Imaging is funded by a consortium including Mitsubishi, Lockheed and E-Systems and expects to launch its first satellite, with one-meter resolution capability, in late 1997. EarthWatch was formed by the merger of WorldView Imaging—designer of the EarlyBird satellites—and parts of Ball Corp.'s aerospace and communications group. Longmont, Colo.-based EarthWatch plans to have a satellite with three-meter resolution capability in orbit by the first quarter of 1996 and its first one-meter resolution capability satellite in space by the second quarter of 1997. Another U.S. venture, Eyeglass, started by Orbital Sciences Corp. and GDE Systems, subsequently acquired by Tracor, is trying to firm up its financing. *—S.S.R.*

figurations of billboards inevitably led to the construction of new maps and more attempts at explanation. The process was labor-intensive, frustrating and time-consuming.

So with the help of a subsidiary of Strategic Mapping in Santa Clara, Calif., Whiteco is introducing a GIS that will contain standardized digital maps of the areas where it has billboards. Every billboard the company owns is pinpointed exactly using the Global Positioning System, and photographs of the board and its location are being stored on compact disks. Other data, such as traffic-flow patterns, are also being merged in.

Soon a Whiteco salesperson will be able to show prospects brilliantly colored computer-generated maps with proposed billboard sites clearly marked. He will be able to provide a recent photograph of the site as well as data on traffic flow. Any necessary changes will be illustrated instantly.

It gets better. "State transportation agencies do origin and destination studies of drivers on various highways, and statistically aggregate them into geographical areas known as Transportation Planning Zones (TPZs)," says Antenucci. "We can tie the TPZs to census tracts, get telephone-exchange and zip-code data and merge it with demographic data from firms like Donnelly and Dun & Bradstreet. We can demonstrate the averages of the incomes of these drivers, the products they buy and how much they spend."

With such rich data, Whiteco will be able to charge premium prices for many locations. "We will be able to pull in many new customers," says Joe Little, senior vice president of operations for the company. "If we know what the drivers are buying, we know which firms to solicit."

The system will also provide better support to managers. "We don't do as good a job as we should do at inventory management," says Little. "Some billboard locations bring in as low as half the revenues of others at comparable locations." The new system can generate maps marking poorly performing locations, compare their results to other locations and show how they vary over time. As more attention is given to underperformers, and unprofitable customers are dropped, Little expects overall revenues to rise.

Whiteco's GIS system is expected to be tested this summer and implemented by the end of the year.

GIS and a billboard company make a perfect match, but others are using the system in less obvious ways:

- The cellular phone company Cellular One manages some 300 cell sites in northern California. Its Bay Area office has a centralized network management center that includes a special monitoring room containing huge display screens. It is a state-of-the-art management system.

"We tied MapInfo into our automated system so that we can see exactly where problems are occurring," says Rob Grace, manager of the center. "We know where customers are experiencing 'call disconnects,' where battery failures are taking place and where unauthorized persons may have broken into one of our remote buildings. Since we can pinpoint the difficulty, it is easy to tell if remote maintenance can be performed. If not, we simply page the nearest technician and give him precise directions to the site from wherever he is."

In the past, the company had three separate management centers, each of

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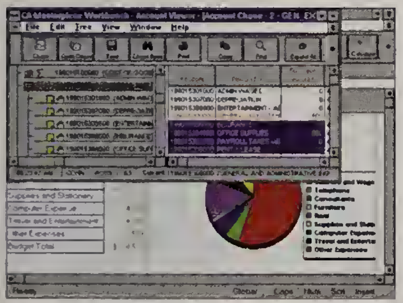

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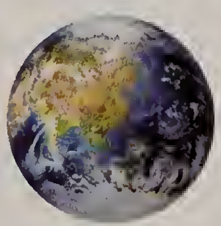

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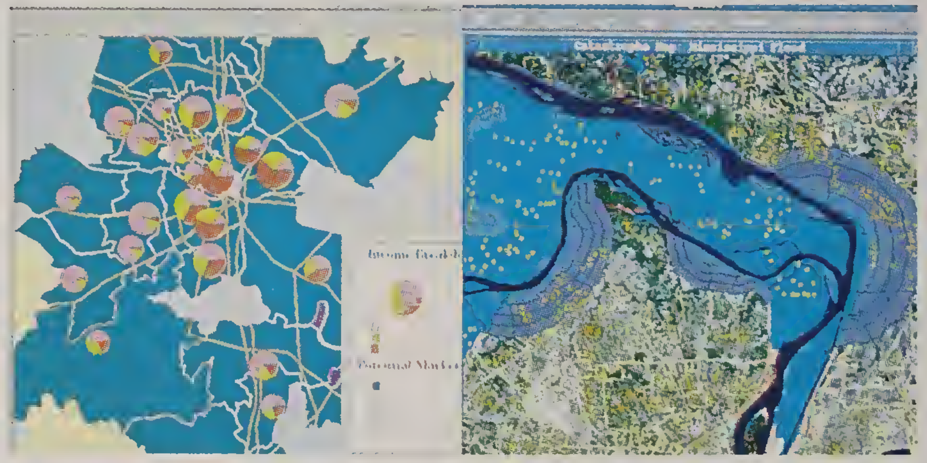
which maintained its own data. Network maintenance staff members in one area were unaware of problems in another until customer complaints started coming in. "Now," says Grace, "If AT&T goes down, I know exactly where it did so and can get it fixed much faster. It also helps with customer service. If any customer experiences five or more disconnects, we check to see if the problem is with us. If it is, we give credit. If it is not, we call the customer and have him or her come in for free phone maintenance. We now get far fewer angry calls."

•When Hurricane Andrew devastated 400 square miles of Florida in 1992, the street signs and landmarks in many areas simply vanished. Roads were all but impassable, residents were disoriented and thousands of outside troops and relief workers could not find their way around.



At the time the hurricane hit Florida, Tom Mulhall was a project manager for response-recovery information systems at the Federal Emergency Management Agency (FEMA). He mapped all command posts, public shelters, distribution centers, medical facilities, passable roads and bridges in the area of the disaster—an enormous, ever-changing list.

The GIS maps were used by FEMA, the police, EMS, the National Guard, the Red Cross and others. "We had no time to train users or worry about system compatibility," says Mulhall. "Insurance claims processors were using Macs and Windows and Unix machines. MapInfo performed superbly in very demanding conditions."

When the Midwest floods hit, detailed maps of the entire Mississippi flood plain were created using MapInfo, and the director of FEMA used them to brief President Clinton.

•The Los Angeles Police Department is divided up into 18 different areas—roughly corresponding to New York City's precincts—with distinct geographic borders. Census tracts defined a patrolman's "basic car area" without regard to natural or community boundaries. So officers patrolling one area were often unaware of crimes committed nearby in another. Areas of similar size had vastly unequal numbers of "calls for service." Shops and commercial establishments on opposite sides of the same street sometimes fell under different divisions and were assigned to different officers. Looking for connections by checking crime reports by hand was a tedious and frequently futile exercise in a city where 350,000 crimes are documented each year.

The result: Patterns of crime frequently went undetected.

So the police department turned to GIS. Using MapInfo, the city was remapped using data on patterns of calls for service, natural ethnic and economic divisions, community boundaries and similar variables, and then redistricted. Now the LAPD can boast a higher, more uniform level of service. The department also uses GIS to fight crime directly. All carjackings within a certain distance of a freeway, for example, can be mapped with details such as type of car, criminal's age and ethnicity, time of day and so on. Chronological sequences of crimes can be portrayed through blinking pinpoints on a computer screen. With a clear pattern guiding them, officers have a better handle on when and where to position stakeouts.

"Last year homicides went down by 21%, robberies by 20%, sexual assaults by about 12% and aggravated assaults by 6%," says Detective Jesse Castillo of the department's crime analysis unit. "At least some of this decline is due to more efficient use of our resources using the new system."

Providers of GIS products and systems are popping up like, well, pins on a map. "ESRI in Redlands, Calif., and Intergraph in Huntsville, Ala., are the leaders in workstation environments," says Antenucci. "ESRI is dominant in providing GIS to local governments while Intergraph is strong in servicing utilities and the military. MapInfo is the leader in the desktop environment, with Strategic Mapping a strong second and ESRI not far behind. Lots of smaller companies are trying to establish themselves as well."

These companies aren't just sitting around waiting for businesses to come to them for help. Every GIS company is also busy building up its own proprietary data bases of maps, demographic and other data and contracting with third parties, such as research firms, to offer their data to customers who use them to draw ever more detailed maps.

"GIS is on the verge of making the transition from a technology that's carefully evaluated prior to implementation to one that's specified as a standard option," says Antenucci. "For example, in the next few years, GIS-based travel access guides will become common in all tourism facilities. You'll be able to walk into your hotel lobby and plan your entire week from choices on your computer screen—where to eat, what places to tour, what routes to take. You'll even be able to make dinner, hotel and theater reservations on-line."

So if you work for a company that makes colored push pins, better polish up your resume. ■

Srikumar S. Rao is chairman of the Marketing Department at the C.W. Post campus of Long Island University.

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Data Cruncher

Parallel processing helps companies mine their mountains of data for nuggets of gold.

by Srikumar S. Rao

You run a large company—a department store chain perhaps, or a big bank—with thousands of customers. Fifteen years ago you went out and bought an enormous mainframe computer to process the millions of transactions your customers make. It was enough at the time, but no longer. Now you need to be able to extract more information from the huge mass of data you have built up—information that will tell you more about your customers and help you gain a marketing edge.

You need a parallel-processing computer to supplement your mainframe.

In this computer architecture, large problems are split up into components, and many different processors each tackle one of the components at the same time to reach a solution much faster.

Imagine that you want to publish a comprehensive history of the world. You could hire one scholar to write the whole thing, in which case he or she would take a very long time indeed. That's how a mainframe works. Or you could hire a number of qualified historians, each of whom would write about a particular period or geographic region, and an editor to patch the pieces into a seamless whole. Your history would get to market a lot sooner. This is how parallel processing works.

> "Complex queries chew up processing power like Godzilla. Complicated questions need parallel processors."

"Here is a simple way to understand the difference between a mainframe and a parallel processor," says Hubert Delany, research director for high-performance computing for the Gartner Group. "Most mainframes have two to four processors—the portion of the computer that actually performs operations—and you cannot increase the number. If you try to add processors, the cost goes up significantly but you do not get a corresponding increase in performance. The architecture of the mainframe is such that the processors share resources like memory, peripheral and communications input and output, bus bandwidth and so on. You cannot increase

Bass Taverns CIO Brian Wilson

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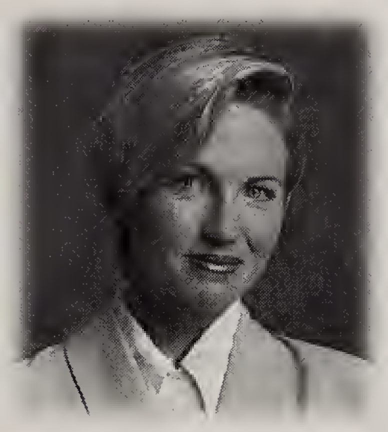

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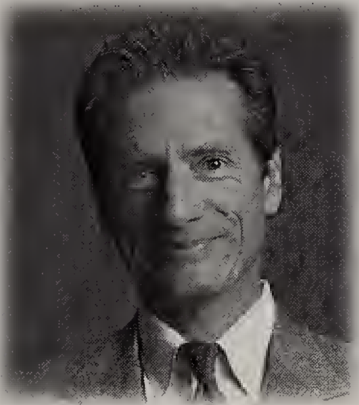

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these resources and they constrain the number of processors you can add.

"In contrast," continues Delany, "the architecture of parallel processing is such that each processor has its own memory, input-output and other resources. This makes them scalable. So if you need more power, you simply add more processors. You do, however, need good software to make use of the power." Large parallel-processing computers frequently have dozens of processors and are thus much more powerful than most mainframes.

Mainframes are exemplary for answering questions like: "When is the next flight from New York to Los Angeles? Are there seats available? Book me on the flight." But what if you want an alliance with a hotel chain and you need data to plan your presentation? You may have more involved questions: "Give me the names and addresses of all passengers who flew from New York to Los Angeles between Jan. 1 and Jan. 31, used frequent flier upgrades and earned at least some mileage by staying in Hyatt and Marriott hotels." Now the mainframe is less satisfactory. It would take a long time—pehaps hours or days—to get your answer. And the big box would not be able to do anything else while it tries to respond to your query.

"Complex queries chew up processing power like Godzilla," says Brian Jeffery, managing director of International Technology Group in Mountain View, Calif., an information services consulting firm. "If you have a small data base, you could get by with doing your queries on a mainframe. But if you need to access large, enterprisewide data bases and have complicated questions, you absolutely need the much greater power of parallel processors."

Large companies collect massive amounts of information. The checkout systems of retail chains, the reservation systems of airlines, hotels and car rental firms, the billing systems of telephone and cable companies, all continuously acquire more and more data.

Most is never used after the initial purpose it was collected for is served. But it is possible to analyze the data to come up with new insights into customer preferences and behavior that can then be translated into sales and profits. Why isn't this done?

Well, for one thing, the data resides in many places within the company. The transaction-processing system is typically separate from the accounting system, which is separate from the manufacturing system. Gathering related data from these different sources is no easy task, and analyzing it can sorely tax even the most powerful mainframes. Companies are also very sensitive to possible disruption of crucial computers that keep the business humming.

The power of parallel-processing computers is well-established. Scientists have used them for more than a decade for complex tasks like simulating weather patterns and the reactions

inside a particle accelerator.

The early parallel-processing computers, with their custom chips and software, were too expensive for general business use. They lacked flexibility since there were few applications and fewer application development tools. But the cost of parallel-processing power has declined, and better operating systems, application software and development tools have evolved. And so businesses have started looking at these devices to help shape their strategies.

The Open Parallel Unisys Server—or OPUS—is a parallel-processing computer that can focus the resources of dozens—even hundreds—of processors simultaneously on complex problems and quickly examine mountains of data. Information can be collected swiftly from data bases, stored in a data "warehouse," combined with external data—such as market research—and analyzed in a complex fashion. Business operations are not disrupted.

"Putting together a high-performance box is the easy part. The hard part is making it work like it is supposed to."

OPUS, the system which Unisys designed jointly with Intel, uses state-of-the-art Pentium processors. Intel's highly advanced interconnect technology links them together and lets them communicate efficiently at high speed.

It is scalable, meaning that you can tack on as many processors as you need to get the job done. It will not become obsolete, because newer generations of Intel chips will work smoothly with it.

In a sharp break with the industry practice of keeping operating systems proprietary, Unisys has decided to license its operating system to all comers. A number of software firms, including data base giant Oracle, have adapted their flagship products to run on it, making it easier and faster for firms to develop their own custom applications.

Alan Lutz, president of Unisys's computer systems group, provides an example of such an application. "Lets assume that a bank wants to embark on a campaign to offer home-equity loans, which could generate additional fee income. The marketing department could use information discovery tools running on an advanced parallel system to sort through checking-account activity and identify homeowner customers who pay mortgages by check and also carry credit card balances. The bank could offer those customers a special home equity loan to consolidate debts, with automatic payment for both the loan and the mortgage on the first of the month."

But banks and insurance companies are not alone in turning to parallel processing. Consider $7 billion-in-revenues Bass PLC, owner of Holiday Inns and the U.K.'s largest brewery. Bass Taverns, its restaurant division, has revenues of $1.7 billion and operates some 4,500 pubs throughout the U.K. Though steeped in tradition, the pub business has changed dramatically in recent years. Competition is no longer the tavern down the lane, it is everything from soccer games to video arcades. "We see ourselves as being in the leisure business, and therefore we are in competition with many, many other people for the leisure pound," says J.W. Angles, chief executive of Bass Taverns.

Bass Taverns recently installed an electronic point-of-sale system that records every sale made at each pub and sends the information back to headquarters each night. "We know exactly what is happening in our pubs on a daily basis and can even get it in real time," says Brian Wilson, director of information technology. "We know what is selling and what isn't, we can quickly detect changes in sales patterns and we make sure that what our customers want is always in stock."

Impressive as it is, the point-of-sale system is no longer sufficient to sustain Bass Taverns' competitive advantage. "We know what we are selling and where and how much," says Wilson, "but we do not always know why. Our pub managers are empowered to carry out local promotions and have budgets for them. We want to tie sales to promotions at national and local levels. If a technique tried by a pub is successful we want to know about it and replicate it. If it is a failure, we want to spot it very quickly and kill it."

"Most mainframes have two to four processors, and you cannot increase that number."

So Bass Taverns ordered a parallel-processing computer from a firm in the U.K. "St. Patrick's Day is very important in our industry and we were looking at the effect of St. Patrick's night events," says Wilson. "In some pubs we cut prices to encourage customers to come in and indulge. In others we held the line. In still others we put on entertainment such as fiddlers or accordion players providing Irish music and charged premium prices. The premium-price strategy won hands down. Profits from additional sales more than offset the cost of staging the events. And our customers had a good time.

"Our present parallel-processing system is a small one and we needed to increase it dramatically," adds Wilson. Which is why he was delighted when Unisys, a longtime and valued supplier of mainframes, announced OPUS. The machine earmarked for Bass is being tested in the U.S. and will be shipped to the U.K. and installed shortly.

Bass Taverns knows exactly how the OPUS will be used. "We will experiment with pricing," says Wilson. "We intend to introduce loyalty cards and target promotions to individual customers. If Charlie is a regular customer of Dog 'N Duck, we will give him a round of drinks on his birthday. We'll try to make sure that he never feels the need to go elsewhere."

"OPUS is the most important new product announced by Unisys since it was formed nine years ago," declares Unisys CEO James Unruh. It is an important component of the computer maker's effort to transform itself from a traditional computer company into an information management company.

Licensing the OPUS operating system to third parties is a calculated bet. The hope is that enough independent companies will devise solutions to business problems on it that it will rapidly become a major presence. Because software companies typically put their applications on the leading platforms first, Unisys needs a large presence if OPUS is to survive.

There is competition in the marketplace. International Technology's Jeffery estimates that IBM shipped 350 or so units of its SP2 machine in 1994, the first year it was marketed aggressively. AT&T has sold several hundred units of its Teradata 3600 in the last few years. Both are parallel processors with proprietary operating systems and are comparable to OPUS in terms of raw computing power.

"Putting together a high-performance box is the easy part. Computers are commodities," says Jeffery. "The hard part is making it work like it is supposed to." This is where Unisys hopes to make its mark. It is betting that its ability to integrate OPUS with a company's computer environment, and its detailed knowledge of many industries, will give it an edge. Unisys has developed specific applications for industries like transportation, communications and retail and is working on many more. It has hired and trained consulting professionals and is prepared to greatly increase their number if sales pick up as expected.

"The architecture of parallel processing is such that each processor has its own memory, input-output and other resources."

"The Teradata is now old technology, and not too many new customers are buying it," says Jeffery. "IBM's SP2 is well-optimized for the IBM mainframe environment, but it does not run very well in some other environments such as the Unisys mainframe environment. OPUS has a design that will run particularly well with Unisys mainframes. It is too early to say how it will interact with computers made by other companies, but it should do reasonably well if Unisys systems integrators are good. There are more than 5,000 large companies worldwide that are potential customers, and most of them do not presently have parallel-processing computers."

There is also the real possibility that once the power and utility of such parallel-processing systems becomes apparent, many midsize firms will want in on the action. This is even more likely to happen if, as expected, the price of the machines drops. An OPUS with eight processors and 40 gigabytes of memory is priced at just under $700,000 at present.

That includes the operating system but it does not include applications or the consulting help required to develop custom programs for specialized needs With these, the package could top $1 million, and that's a lot more than most smaller companies are willing to pay.

Unisys has a blue-chip roster of satisfied mainframe clients, and many will probably buy OPUS additions to complement their systems. "Decision support using parallel-processing computers to help shape corporate strategy is like a child playing a PC game," says Lutz of Unisys. "Your skill increases and you soon need a more powerful PC to handle the better graphics of advanced games. As executives gain experience the level of complexity of their questions increases dramatically." Which bodes well for Unisys and OPUS.

It is likely that Unisys will become a significant player in parallel processing because of its superior product and service. The market has yet to speak on whether it will become a leader. There are many IBM mainframes around and the company is aggressively marketing the SP2.

One way or another, parallel processing is in your future. The IRS has just announced a $500 million contract to replace its aging machines with Unisys mainframes. Millions of Americans should be hoping that this particular Unisys client does not take the next step and invest in an OPUS. ∎

Srikumar S. Rao is chairman of the Marketing Department at the C.W. Post campus of Long Island University

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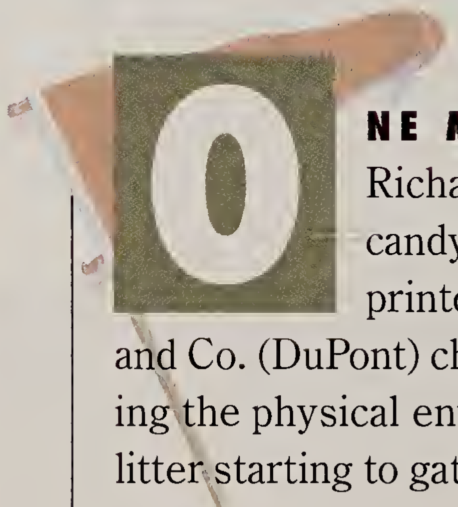
BY LEIGH BUCHANAN



ONE MAN'S GARBAGE is another man's vital information. Richard Knowles, for example, can learn more from discarded candy wrappers and plastic cups than from a ream of computer printouts. The former manager at the E.I. dupont de Nemours and Co. (DuPont) chemical plant in Belle, W. Va., says that constantly monitoring the physical environment is the best way to ensure safety. "When I saw litter starting to gather on the ground, I could tell people's attitudes were going bad," says Knowles. "Their awareness was going bad. And when that happens, somebody gets hurt pretty soon."

There's nothing novel about the observation that business information isn't limited to downtime reports, market-share statistics and profit-and-loss statements. The information-gathering process is eclectic, and while managers will always need repetitive reports of regularly occurring information, they rely even more on direct observation, meetings, informal notes and impromptu conversations in the restroom. Outside the corporate citadel, an ever-growing treasury of data sits in databases, government agencies, trade journals and scientific papers, just waiting to be exploited. And then of course there is serendipity, the "fortuitous accidents that reveal information crucial to solving an important problem," in the words of Vincent B. Barabba, general manager of the Strategic Decision Center for General Motors Corp. and co-author of *Hearing the Voice of the Market* (Harvard Business School Press, 1991).

What makes things interesting is that, serendipity excepted, companies everywhere have access to essentially the same information. So the challenge is not simply to locate critical data—although that's im-

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portant, too—but to apply it better and faster than the next guy. That requirement has led management theorists to portray successful companies as giant information-processing organisms, absorbing a wide array of external data and combining it with up-to-the-minute internal reports to produce sound—occasionally ingenious—business decisions. In the best of all possible worlds, every employee is an enlightened knowledge gatherer, capable of recognizing important information and passing it quickly to the right person in the right format.

To achieve this, management must first define the company's information needs, then communicate them to the rest of the organization. They must "think through what is information for them, that is, what data they need; first, to know what they are doing; then, to be able to decide what they should be doing; and finally, to appraise how well they are doing," writes Peter Drucker in the January/February 1995 *Harvard Business Review*. (One organization that has failed at this in a much-publicized way is the CIA, which, in the wake of the Soviet Union's demise, still employs 7,000 analysts chasing after "secret" information that in many cases isn't secret anymore.)

But understanding what is important can be tricky. There has been, after all, an enormous proliferation of information: facts, theories, whole new branches of science—not to mention new ways of accessing that information, many of them technology-based. The marketplace, meanwhile, is characterized by growing legions of more-diverse customers and competitors, none of whom come stamped with directions for easy handling.

"It's not like information comes with a little flag on it that says, 'Look at me; I'm your proactive piece of data,'" says Leonard M. Fuld, president of Cambridge, Mass.-based Fuld & Co. Inc. and author of *The New Competitor Intelligence* (John Wiley & Sons Inc., 1995). "The people in this world who make money are the people who see things in information that other people don't see."

Fuld says it is possible to train entire organizations to see this way, but it requires snapping employees out of their job-specific myopias and showing them, instead, the big picture. Salespeople talking to customers about other suppliers, R&D folk attending scientific conferences and technical staff perusing comments and complaints posted to Internet-based newsgroups must be taught to recognize good stuff that can be turned to the company's advantage.

"All these people are potentially analysts," says Fuld. "You just have to give them an ongoing observance of what's happening [in the company at large]."

IDEALLY, EMPLOYEES WON'T just stumble over valuable information; they'll actively seek it. Fuld tells the story of a marketing manager at Banc One Leasing Corp. in Dayton, Ohio, who, in an effort to get a handle on her competitors, asked employees to send her any mailings they received at home from other banks. "She started receiving bales of information: literature, brochures, direct-mail pieces," says Fuld. "By piecing them together, she was able to get a good sense of the competition's strategy."

Jane Linder, director of business development for Polaroid Graphics Imaging, a division of Polaroid Corp.

Reality Check

How much intelligence should you expect from a CIO?

A HOT TOPIC AMONG IS CRITICS, these days, is whether the folks in the systems organization ought to be up to their elbows in gathering and analyzing information as well as manipulating and delivering it (see related story, Page 68). Jessica Keyes, president of New York-based consultancy New Art Inc. and the author of numerous books on IT, thinks it's a bit much to expect the people you hire for their technical expertise to be masters of intelligence as well. She tells the cautionary tale of a major pharmaceuticals company that put its IS organization in charge of transforming the online information it downloaded into intelligence. IS didn't know how to do it, and, as a result, the CEO deemed the $12 million worth of information the company downloaded over the course of a year to be worthless.

Where IS *can* prove effective, Keyes says, is in scoping out its own competition, keeping up not only with the latest technologies but also with how other IS organizations are using them. "What [CIOs] ought to be doing is competitor analysis," says Keyes. "They ought to say, 'Hey, maybe I'll put together a team of three of my people and three end users, and we'll hire a consultant and go out and assess our competitors and compare ourselves to them.'"

Leonard M. Fuld, president of Cambridge, Mass.-based Fuld & Co. Inc. and author of *The New Competitor Intelligence*, takes it a step further. IS has become the focal point for much of what takes place in certain types of organizations, he points out—for example, it is deeply tied into the R&D efforts at chemical, pharmaceuticals and computer companies. From there, he concludes, "if you understand how [another company's] system works and how it's configured and what it's used for, you can begin to anticipate new-product development."

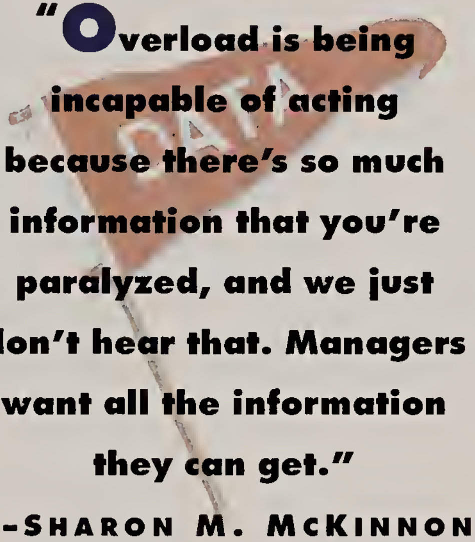
Fuld recommends that IS groups gather intelligence by carefully reading newspapers and trade journals and also by chatting up their vendors. "You've got these common connecting points," Fuld explains. "If you're talking with a rep who's selling you an upgrade to a product you use to process your inventory, don't you think that same rep sells to a similar company in the next state?"

–L. Buchanan

in Cambridge, Mass., says her company considers every employee an "intelligence professional." She compares this with more-traditional approaches, where specially trained employees in areas like market research or information management are organized as a discrete staff function, largely isolated from day-to-day business activity. Under those circumstances, "it can get to the point where you're maintaining giant factories of information with not very much value," says Linder. "People go out and do studies and then come back to decision makers and force their way in through the fog of limited attention and try to get some influence. That's a difficult model to make work."

Barabba agrees, adding that companies often get into trouble by relying too much on the market-research organization for their understanding of customer needs. Instead, he says, companies should encourage not only "listening to the right people but having the right people do the listening."

He describes a market-research project he participated in five years ago to test consumer response to GM's new Camaro and Firebird models. "We took a couple of engineers along, and we were talking about brakes with the customers," he recalls. "The customers were saying how they wanted to stop, and we kept hearing it in terms of what distance they wanted [the car to be able to stop]. But [one of the engineers] understood that what they wanted was to be in control while stopping. And because of his knowledge of braking systems he said, 'You know, what they really want is for me to adjust the feel of the stop, and there's a neat way of doing [it] that I've just been reading up on.'"



"Overload is being incapable of acting because there's so much information that you're paralyzed, and we just don't hear that. Managers want all the information they can get."

–SHARON M. McKINNON

JUST AS NOT ALL INFORMATION is external to the corporation, not all information is external to human beings. Ideas, experiences, an understanding of what is possible—such things travel around in people's brains from day to day waiting to be unlocked by the right question or observation. For that reason, the company-as-information-processing-organism must give employees frequent opportunities to interact, both in meetings and, less formally, in common areas like restrooms and around the proverbial water cooler.

"These are places where people get together and, in many cases, the topic of conversation is work because that's what they have in common," says William J. Bruns Jr., a professor of business administration at the Harvard Business School and co-author, with Sharon M. McKinnon, of *The Information Mosaic* (Harvard Business School Press, 1992). "I think effective senior managers understand that communication is very important, and walking in and out of the same door, eating lunch in the same cafeteria, gives people an opportunity to see each other and remember something that might be relevant to their friend," says Bruns. "The corridor is a primary source of work information."

Still, plenty of organizations continue to equate casual conversation with wasting time and money. Even at colleges, which are supposed to be, well, collegial, employees are not always encouraged to engage in potentially productive chatter. Bruns tells of one business school he knows of that, in the course of remodeling its faculty offices, "removed all drinking fountains and did away with restrooms shared by more than one person." As a result, he says, the teaching staff felt isolated because there was "no place left where people could automatically run into each other."

Even in an organization rife with knowledge hunters and gatherers, there is no guarantee that information will be used intelligently or even accepted by corporate decision makers. The acceptance of information often depends on who collects and analyzes it, and some executives consistently rate the findings of high-priced consultants above those of an underling or colleague. Fuld calls this "the CNN factor: People would rather believe some talking head on a television screen than someone who's been in their company for 20 years." When *The American Experience* debuted on PBS in 1988, for example, a historian writing about the series for *TV Guide* magazine took the program to task for overlooking a number of important subjects. One of the magazine's fact checkers called PBS, established that many of those subjects would, in fact, be treated in future seasons and reported her findings to the editor. He decided to "go with the writer" and ended up having to apologize in print.

Conversely, ignoring credible outside information is also foolish. The Edsel, Barabba reminds us, was considered one of the most exhaustively market-researched products of its day. But while Ford collected considerable data on customer preferences, it ultimately chose to rely on the opinions of various internal committees. The result, of course, was that instead of becoming a classic, the car ended up as a punch line.

The most dangerous situation exists when executives simply reject information because it clashes with their firmly held beliefs; employees—once they've figured this out—cease bothering to offer information.

In fact, many experts say, information rises in value the more it defies expectations. "The greater the discrepancy between what was predicted by managers and the actual result, the more valuable the information," says Barabba, who recommends that companies expend less effort collecting confirmatory information and more on exploratory or developmental research.

Nonetheless, regular reports and confirmatory data

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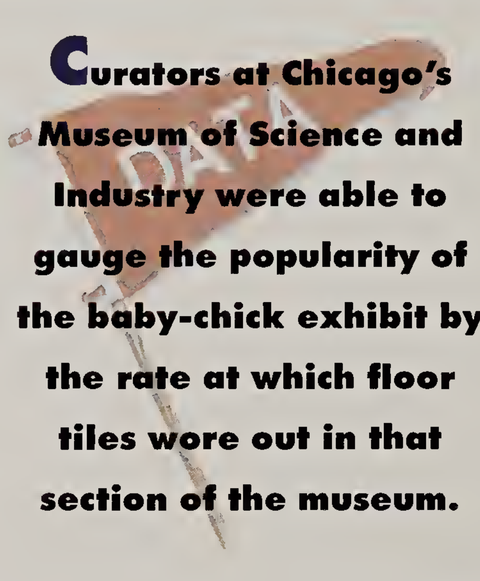
are still important. Even the most open and innovative managers like to track—in a general way—their operations' routine activities. “Top managers who come from functions like marketing and production will frequently continue to demand the same kind of information that they needed when then were plant managers or managing a territory,” says Bruns. “They still want to know daily production; they still want to know daily sales in units; they still want to know downtime. All those things reassure a manager that things are going as expected.”

At the same time, Bruns adds, what managers really need to know are exceptions to that routine. “No airline executive needs a daily report or a real-time report of how much luggage they're handling,” he explains. “But they are very interested in how much luggage is lost and the time it takes to get it back to passengers.”



Curators at Chicago's Museum of Science and Industry were able to gauge the popularity of the baby-chick exhibit by the rate at which floor tiles wore out in that section of the museum.

GENERALLY, EXECUTIVES—good ones, anyway—are open to new information and perfectly happy to question assumptions. What they object to is not troubling content but rather poor presentation. It is here, McKinnon believes, that the “myth” of information overload arises. “We've talked to almost 250 senior managers, and not one has ever told us that he or she had too much information,” says McKinnon, a professor of business administration at Northeastern University in Boston. “Overload is being incapable of acting because there's so much information that you're paralyzed, and we just don't hear that. Managers want all the information they can get.”

What people *do* complain about, McKinnon says, is not being able to find the information they need: the information that allows them to take action or monitor what is happening *now*. Most managers, she has found, want information presented to them in specified categories, with useful relationships delineated and the highlights summarized. (This is an area, of course, where IT tools, including executive-information and data-warehouse systems, can prove invaluable. See “Trendlines,” Page 14.) Once again, the CIA provides a useful negative example: The agency reported that Mexico's foreign currency reserves were in danger months before that country's financial crisis, but officials say the warning was submerged in a sea of economic intelligence, with no indication given as to its importance.

As Barabba sees it, a central tension exists between information providers, who, when faced with uncertainty, want to provide managers with more data and more analyses, and managers who want less information but with greater value—that is, information placed in a decision context. The challenge, he says, is to “create an interface that will link humans and complexity while preserving the original properties of each.”

Even if the amount of information presented is not overwhelming, it may appear so unless a clear context is provided and uniform definitions applied. Establishing corporatewide agreement on the meaning of words like “sales” is essential to efficient, unambiguous decision making. Those definitions should be carefully explained to new employees, who may have brought semantic baggage from their former jobs. But while it's tough getting two departments to agree on common meanings, that problem is compounded by the growing tendency of companies to form information links with customers and suppliers. The fact that companies must increasingly know the cost of operations outside their organizational boundaries, Drucker points out in the *HBR*, “requires uniform or at least compatible accounting systems at companies along the entire chain. Yet each one does its own accounting in its own way, and each is convinced that its system is the only possible one.”

Such differences make meaningful comparisons difficult and can sometimes result in chaos, as the auto industry discovered recently when it switched to a new system of reporting sales. The new terms of the system had not been carefully spelled out, and manufacturers were so confused that they couldn't even agree on how many days their dealers' showrooms had been open the previous month.

OF COURSE, QUESTIONS of format and standardization do not apply to one of the most fundamental types of business information: that which is gleaned from simple observation. Fuld describes how curators at Chicago's Museum of Science and Industry were able to gauge the popularity of the baby-chick exhibit by the rate at which floor tiles wore out in that section of the museum. A sizable decrease in cars parked in a competitor's lot could mean it's losing business; a sudden flurry of help-wanted ads could mean it's expanding.

When Knowles was a plant manager for DuPont (he is now the company's director of community awareness, emergency response and industry outreach), he spent two or three hours a day strolling around the plant floor, chatting with people and keeping an eye out for unsecured ladders and employees working without goggles or gloves. “You can't manage sitting behind a terminal,” says Knowles, who saw the frequency of accidents drop from 5.8 to 0.28 per 100 employees during his eight-year tenure. “I'd end up doing the paperwork at night because I didn't like being trapped in my office during the day. Reports give you a broad picture, but you need a firsthand feeling of what's going on.”

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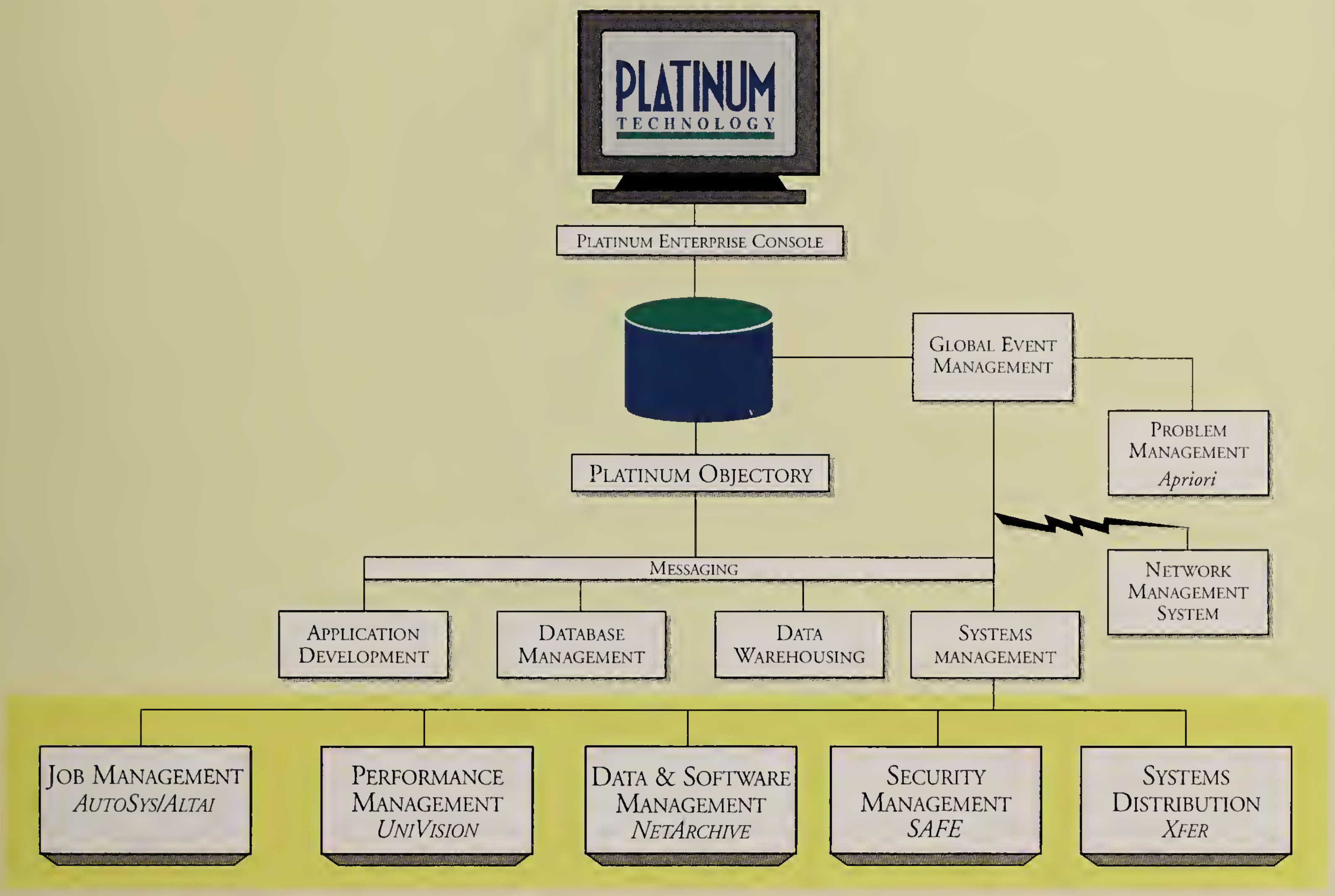
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Rx for Success

At Pfizer, IT means more than information technology.

It also stands for insightful thinking.

BY ALICE DRAGOON

VITA CASSESE RUNS the IS and market research organization for the biggest division of the world's fifth-largest drug company. But getting the woman to talk about technology is next to impossible. If pressed, she'll tell you that her department is in the final stages of a client/server migration, oversees 200 or so databases of market, financial and clinical-trials information, and is supplying the sales force with laptops running proprietary software that will leave competitors drooling. But really, she'd rather discuss philosophy.

"I believe that the technology is just one small component of the continuum," says Cassese, who is vice president of systems and market research for the U.S. Pharmaceuticals Group (USPG) of New York-based Pfizer Inc. "You can't effectively manage the information unless you know how it needs to be—and why it needs to be—communicated." Her 79 staff members see themselves not simply as the folks who run the computers but as information experts whose job it is to collect, manage and analyze data, delivering exactly what their colleagues need to know in a useful format—with insight. "Our mission is understanding what information is needed to help the business meet its strategic direction," says Cassese.

Given the uncertainties implicit in long product cycles and a health-care industry in flux, information is a priceless resource at Pfizer. A drug's journey from lab to medicine cabinet can take 10 to 20 years—leaving plenty of time for dramatic changes in market conditions and medical needs. (For example, Pfizer's antifungal medicine Diflucan, which is now used to treat AIDS patients, was developed in the mid-1970s for cancer patients, long before AIDS was making headlines.) Pfizer, like others in the industry, may spend $370 million bringing a new drug to market. Then it has only six to 12 years of patent-protected commercial life in which to recoup its investment, after which cheaper generics can swoop in and capture as much as 60 percent of sales. That means Pfizer must invest heavily in R&D—$1.4 billion in 1995—to keep its pipelines filled with potential products, and be ready to bring them to market once they're approved by the FDA.

In addition, the protean health-care scene—with its growing cost-consciousness, countless regulations and cutthroat competition—is affecting Pfizer's customer base. As managed care organizations (MCOs) and pharmacy benefits managers (PBMs) nudge aside physicians as gatekeepers of the mar-

PHOTO BY KENT HANSON; SPECIAL ISSUE ICON BY JEAN TUTTLE

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INSTRUMENTS

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BRINGING A NEW DRUG TO MARKET REQUIRES AN INVESTMENT OF SOME $370 MILLION. GETTING ACCURATE INFORMATION ABOUT EACH DRUG TO THE PHYSICIANS WHO CAN PRESCRIBE IT DEPENDS ON A SOLID INFORMATION INFRASTRUCTURE.

ketplace, the onus falls on companies like Pfizer to prove their products are cost-effective as well as safe and efficacious.

The burden of managing the information that will make it possible for Pfizer's USPG to effectively market its products in this turbulent environment rests squarely on the systems and market research (S&MR) department. In 1993, USPG Executive Vice President Karen L. Katen decided to combine USPG's IS and market research functions, putting Cassese, then vice president of systems, at the helm. The department's hybrid nature is reflected in its staffing: While Cassese began by recruiting specialists at either end of the technical/research spectrum, she realized that "you can't do the technology unless you understand the business" and today hires mostly M.B.A.s with technical undergraduate backgrounds. "Now everyone is concerned with the entire process, not just the technology or the data," she says.

That process, which she calls information mining, begins with finding and managing the right data sources. S&MR presides over an impressive array of information feeds and repositories, from vast databases of Pfizer's clinical-trials information (used to position the company's products) to data purchased from information vendors that cater to the pharmaceuticals industry. Sources of competitive intelligence and general information about the health-care industry include Pfizer's own sales force, news feeds, online search services and traditional library resources as well as Internet discussion groups and World Wide Web sites devoted to specific diseases.

When ready sources of information don't exist, it's the job of S&MR staff to create them. That might mean conducting primary research among physicians or patients to identify product perceptions or convincing information vendors to track new data. For example, Pfizer now relies on its sales reps to find out which Pfizer drugs are on specific formularies—lists of approved drugs developed by MCOs and PBMs from which physicians must choose when prescribing for patients covered by those plans. The company is now talking with third-party information vendors about supplying such formulary data.

Pfizer has that kind of clout, says Russell Baris, director of new market analysis and management science, because it is viewed as a very loyal business partner. The company's willingness to let other pharmaceutical companies use the information-gathering tools developed at its behest makes the whole proposition more profitable for the vendors. "It's not so much the information that gives us strategic advantage, it's how we use the information," explains Rich Lynn, a director of pharmaceutical systems. "[We'll encourage] a vendor to develop a good front end and let every pharmaceutical company use it. That lets us focus our resources on the data sets that are perhaps more difficult to understand and on how we're going to use the information."

With data sources multiplying faster than S&MR can create individual systems to support them, the department is beginning to focus its efforts on building an information infrastructure. Lynn describes the process as "laying out" data in an accessible way and training people to use basic tools to get at the information themselves. "There's this great big river of data out there. Rather than building dams to try and bottle it all up into discrete little entities, we just give people canoes and compasses," he says.

What kind of canoes people use to shoot the information rapids depends on the complexity of the data and how they want to use it. Several tools let users access external information right from their own desktops. NewsEdge from Desktop Data Inc. of Waltham, Mass., enables custom filtering of real-time news feeds broadcast to a radio antenna at Pfizer. A customized version of Hoover, a product from Cambridge, Mass.-

based SandPoint Corp., dials out to commercial online services such as Knight-Ridder Inc.'s Dialog and conducts searches based on "living" news profiles established by users. Results of Hoover searches can be shared through Lotus Notes. USPG employees also have desktop access to Pfizer's collection of databases on CD-ROM; Internet access is provided as needed.

When it comes to accessing any of the 200 or so Pfizer databases S&MR maintains, the navigating gets somewhat trickier. For straightforward analysis, such as calculating a competitor's market share within a drug category for a given month, users can work with a simple access tool provided by information vendor Scott-Levin to review basic audited market data purchased from vendors. But others may want to delve deeper to look at, for example, the effect of MCO formulary changes on individual physicians' prescribing patterns. Those who need more-detailed data—which is culled from pharmacy terminals nationwide by an information vendor and resides in a 150GB Oracle database—can select from a wide range of tools.

By storing almost all of its data in Oracle databases, which comply with the ODBC (open database connectivity) standard, USPG can give users a choice of data access tools, says Jim Taylor, a director of pharmaceutical systems and market research. He explains that in lieu of a one-size-fits-all report writer, which would be too complicated for novices and too limiting for sophisticated analysts, S&MR developed a menu of off-the-shelf ODBC-compliant tools, including SAS Institute's SAS for statistical analysis, Oracle's SQL, Borland's Paradox, and Microsoft's Excel and Access. Not only can users access information with whichever tool best meets their needs, but when new sources are added, they won't need to learn new skills to use that data.

Although these access tools are now primarily available only to S&MR staffers, they are slowly being rolled out to everyone in USPG who needs them. For now, those without their own "canoes" work through S&MR to get into USPG's databases. As for providing compasses, Taylor is compiling a printed catalog of data sources that may eventually end up online in Lotus Notes, which is being deployed at Pfizer on an as-needed basis.

What made this system of flexible access possible, Cassese points out, was USPG's 1990 decision to migrate to client/server. "A

SUSAN PODWALL AND RICH LYNN ACT AS INFORMATION GUIDES WHO STEER PEOPLE TO THE RIGHT SOURCES AND HELP THEM USE THE DATA CORRECTLY.

PHOTO BY KENT HANSON

All the News That Fits Pfizer

USPG DIRECTOR of Marketing Research Susan Podwall is both an information guide and a filter: In focusing on why people need information, she looks beyond statistical significance to assess what is truly worthy of busy executives' time and attention.

As the publication coordinator of Pfizer's weekly *Market Data Update Report*, which was created shortly after IS and market research merged, Podwall supervises one of the department's most important information-filtering processes. The newsletter was originally conceived as an efficient way to replace myriad marketing reports and share vital market statistics throughout USPG; today, the 17-page paper publication captures for each of Pfizer's 10 major drugs and their competitors the number of new prescriptions written each month, market share, the amount of time reps spend discussing each product on sales calls with health-care professionals and other relevant statistics. Market researchers download the data into Excel when it arrives from information vendors on Wednesday afternoons and work late to prepare a report that hits every desk at USPG by Thursday morning. Because readers needed some context to help them understand which numbers were meaningful, the researchers added a one-page cover sheet outlining major market developments, industry trends and health-care news.

S&MR is also considering adding insights from Pfizer's ongoing primary research to the *Update*, and possibly creating an electronic version that lets readers drill down for more detail. But she insists that user demand—not technology—will drive the decision to go online. "Everyone at Pfizer likes to understand things really in depth," says Podwall. "Superficial does not fly here." *–A. Dragoon*

"It's not so much the information that gives us strategic advantage, it's how we use the information." –RICH LYNN

distributed architecture is absolutely critical," she says. "It allows people the most flexible way to get information into databases [and lets them] view it in the ways that are most meaningful and comfortable for them." What's more, the strategy of providing canoes and compasses instead of building systems will free S&MR staff to act as information guides who can steer people to the most suitable data sources and then help them use the information correctly. Indeed, the department contracts out some programming and market research to give staff even more time to think about information needs.

Given the overwhelming amount of information to contend with in the pharmaceuticals industry, the guide's role is pivotal. "Even if you give people a perfect computer system, they can look at data and draw incorrect conclusions because they don't understand the information they're looking at," says Lynn.

PFIZER SALES REPS call on eight to 10 customers a day, but they never get the thrill of convincing a customer to part with his money. Their job is not to sell pharmaceuticals but to peddle information.

As information brokers, pharmaceutical sales reps must be experts on the drugs they represent and the diseases those drugs treat so that they can share that expertise with the physicians and pharmacists who ultimately prescribe and sell drugs. But these reps, who are evaluated in part based on how well they gather information for the company, represent a prime source of business intelligence. A case in point: One rep got word from a doctor that a presentation to be made on a Thursday at a physicians' group meeting would call into question the safety of a particular category of drugs in which Pfizer competes. Although the presentation was based purely on retrospective analysis and wasn't backed up by an actual study, some patients who read the resulting national press coverage that Friday went off their medication and wound up in the emergency room. But thanks to the advance notice from the sales rep, USPG was able to FedEx relevant background materials and safety data about Pfizer's drugs to sales reps by Saturday so that they'd be prepared to get the facts out to physicians on Monday morning.

One reason USPG was poised to respond quickly to the situation was that the division had restructured its medical, sales and marketing operations into disease-management teams in early 1994. To address the growing influence of MCOs and their need to contain health-care costs, Pfizer decided to develop disease-management guidelines based on the premise that effective—and cost-effective—health care depends on a series of wise decisions throughout the course of treatment, from diagnosis through patient follow-up. In keeping with this strategy, Pfizer formed cross-functional teams—made up of medical, marketing, regulatory, financial and information specialists—for each disease area that Pfizer drugs treat. This move not only

A Force to be Reckoned With

Pfizer's new proprietary software helps its sales force track down—and track—better customer information

ONE EVENING IN MARCH, Jim O'Rourke's bride of two months observed that he seemed less obsessed than usual with his job as a Pfizer district hospital rep. The man who once sacrificed *Seinfeld* to plow through stacks of prescription data and enter sales-call notes on his computer was no longer a slave to its flickering screen. Although pleased, Mrs. O'Rourke was curious.

The answer was, well, elementary. Thanks to Sherlock, Pfizer's new proprietary sales-force software issued to reps on Toshiba laptops, O'Rourke now works faster and smarter during the day.

In 1988, the pharmaceutical territory sales-management software Pfizer gave its field forces on 286-based portable computers represented state-of-the-art technology. But by 1994, neither the software—which was developed for a time when physicians and hospitals were the only customers—nor the unwieldy machines that Group Vice Presicharged employees with responsibility for an entire disease category instead of a single product, it formalized ad hoc working relationships among different functional areas.

The fact that each disease-management team includes two information specialists who manage the team's market research, data sources and technology infrastructure underscores Pfizer's commitment to harnessing knowledge. "Pfizer senior management understands the strategic importance of information management and has invested in the people and technology to put us at the top of our industry," says Katen. "We now have in place an information infrastructure to support the disease-management strategy that we believe will allow us to play an expanding role in improving the quality and cost-effectiveness of health care."

The disease-management team model, which regroups all members of a team in one location, has improved communication and enhanced the flow of information at Pfizer. The alpha blocker drug team, for example, has been using Lotus Notes for several

RUSSELL BARIS'S GROUP DEVISED A FLEXIBLE SYSTEM TO MEET REPS' FUTURE INFORMATION NEEDS.

PHOTO BY KENT HANSON

dent of Sales Hank McCrorie calls "cartops" could keep up with reps' needs.

Without online access to information about which doctors belonged to which MCOs, sales reps had to devise their own ways of tracking MCO affiliations and which Pfizer products an MCO included on its list of approved drugs. What's more, because Pfizer divides its 10 major drugs among three field forces so its reps can become experts on a few products, a Pfizer rep could call on a client without knowing that a colleague had been there the day before. The system frustrated customers, who wanted to deal with Pfizer as one entity.

To solve these problems, Russell Baris, director of new market analysis and management science, sought a system that would allow the three forces to work together, enable reps to access physicians' MCO affiliations and share formulary data online and, most important, be flexible enough to accommodate future information needs. A prototype designed in Microsoft Access gave sales managers an idea of how the system might work; weekly updates incorporated their feedback.

"It's very hard to debate theory of how sales reps might want to work, but using the prototype made it tangible," Baris says. An initial pilot in February 1994 elicited enthusiasm and suggestions from reps in the Salt Lake City area. A second pilot enlisted Dendrite of Morristown, N.J., which customized its Windows-based pharmaceutical territory sales-management system with the functionality Pfizer's field force wanted. Rollout of Sherlock to all 2,200 U.S. reps began in March and is scheduled to finish by the end of July.

Reps and managers alike are ecstatic about Sherlock. As the first regional manager to sit through a training session put it, "This is awesome." Sherlock lets sales reps enter notes that can be accessed by other reps who call on the same customers, share information about which Pfizer products are on which formularies, compose e-mail messages, track sample giveaways in compliance with stringent FDA regulations and review relevant market data refreshed daily from USPG databases. They can call up doctors' names and see information about their office hours, call histories, affiliations with hospitals and MCOs, types of drugs prescribed and how those drugs are paid for. If a doctor asks about unapproved uses of a product (only discussion of approved uses is permitted by the FDA), reps can click on the "physician inquiry" icon and type in the question. Sherlock automatically generates an e-mail to Pfizer's customer service organization in New York, which responds to the physician with a letter or a call. Because Sherlock is loaded on 4.5-pound Toshibas, reps can now input data from a call while waiting for their next appointment, when events are still fresh in their minds.

Once a day, reps plug into a modem and click the phone icon on their screens; their laptops automatically dial into Pfizer's Dendrite database in New Jersey, upload and back up their notes, send and pick up e-mail messages and download market information from the central database. In the near future, S&MR plans to incorporate groupware from Atlanta-based XcelleNet Inc. that will simplify the development of new information-sharing capabilities by an order of magnitude, says Baris. Eventually, Pfizer intends to use the XcelleNet technology to provide reps with access to other types of information, such as clinical studies or sales reports, on demand.

With hard data at their fingertips showing which drugs a physician actually prescribed over the last three months, sales reps like O'Rourke can now target their calls more effectively. "I feel like instead of being dropped into the middle of the desert to fight a war equipped with only a bow and arrow, I now have a nuclear-propelled tank with laser-guided missiles," says O'Rourke. "It feels darn good to know you're the best in the industry. With this new computer we just placed ourselves so far ahead of the next guy, it will take them years to catch up. And by that time, all their patents will have expired."

–A. Dragoon

JIM TAYLOR: OPPORTUNITIES FOR INFORMATION SHARING WITH MCOs MAY LEAD TO MORE-EFFECTIVE TREATMENTS.

months to share meeting agendas, minutes and profiles of team members in what Lynn calls a "living repository."

The model has also led to the creation of entirely new sources of information. As part of its Diabetes Control Network, a series of disease-management guidelines for physicians as well as educational materials and services for patients, the company offers a Q&A hotline for diabetics. By tracking which scripted responses telephone operators access to answer patient questions and which unexpected questions get referred to Pfizer health-care professionals, the company can measure patients' information gaps and use that knowledge to update its educational and marketing materials or even refine its diabetes-management guidelines further.

But perhaps the biggest payoff from disease management will come from information sharing with strategic partners. An alliance with Value Health Inc., a provider of specialty managed-care benefits programs and health-care information services in Santa Monica, Calif., gives Pfizer access to information from that firm's large claims databases as well as to its expertise in analyzing the costs of disease management.

Opportunities for direct partnerships with MCOs also abound. "Often HMOs are data-rich but analytically resource constrained," says Taylor. Many are willing to share information (with patient identities masked) in exchange for analysis. "If we come up with a better way to treat diabetes, they're as interested as we are," he explains.

Because Pfizer's partnerships with MCOs are still in the very early stages, financial issues and questions of how much information to share remain unsettled. For example, USPG is now in discussions with a large West Coast HMO about helping that organization put in an electronic medical-records system. Whether Pfizer shares the cost of installing the system or merely helps the HMO design it, the information resulting from such a partnership is clearly valuable to both: Pfizer could use patient-outcome information captured by the system to refine its disease-management guidelines, which, in turn, would help the HMO control its costs. Taylor suspects that it will be more efficient for Pfizer to help MCOs install electronic medical-records systems and share data than to try to gather information on its own.

Despite the ascendance of MCOs, physicians remain a critical Pfizer constituent group. In order to reach them directly, the company is sponsoring Physicians Online, a service similar to America Online but targeted at the medical profession. Software is now being rolled out that lets physicians access—on Pfizer's nickel—general-interest medical databases such as Medline as well as content provided by Pfizer and other sponsors. For example, Pfizer might provide information on its diabetes-management program. Or it might offer an information service with an MCO that would let doctors see whether patients are covered by that MCO or call up its formulary and drill down for information on Pfizer drugs. Such an arrangement would solidify Pfizer's links not only with those who prescribe its products but also with the MCOs that ultimately pay for them.

As the vast amount of information that flows through Pfizer is increasingly viewed as a marketable resource in its own right, the role of information guide becomes even more critical to the company's success. Suddenly, philosophical discussions about how information ought to be managed seem downright practical. CIO

Technical Profile

The U.S. Pharmaceuticals Group (USPG) of New York-based Pfizer Inc. is responsible for the company's U.S. pharmaceutical operations. USPG's systems and market research organization supports 750 employees in New York as well as a nationwide field force of 2,200.

Databases: Almost all data is stored in Oracle databases on IBM, Compaq and NetFRAME servers running Novell NetWare or OS/2 or on Sun Unix servers, some with capacity of 150GB.

Access Tools: USPG develops proprietary access tools in PowerBuilder, Visual Basic and other client/server development environments. Other database access tools include SAS, SPSS, Borland's Paradox, Q+E, and Microsoft's Access and Excel. Tools for accessing external information sources include NewsEdge from Desktop Data Inc. and a proprietary version of SandPoint Corp.'s Hoover, which runs through Lotus Notes.

Infrastructure: Pfizer has a corporatewide Token Ring network running both Novell NetWare and TCP/IP. At USPG, approximately 700 workstations hook into this network. These include IBMs, Compaqs, Macintoshes and IBM-compatible PCs running either Windows, OS/2 or Windows NT. 2,200 Toshiba laptops with customized Dendrite pharmaceutical territory-management software link the field force to Pfizer's Dendrite database in Morristown, N.J.

PHOTO BY KENT HANSON

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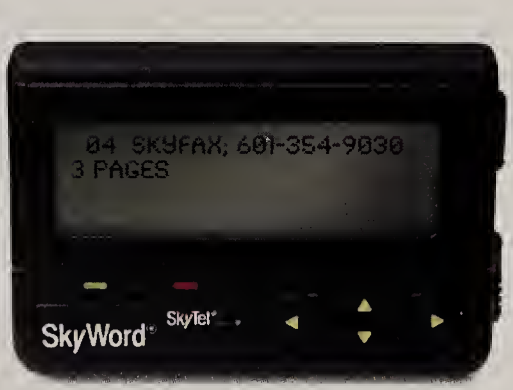

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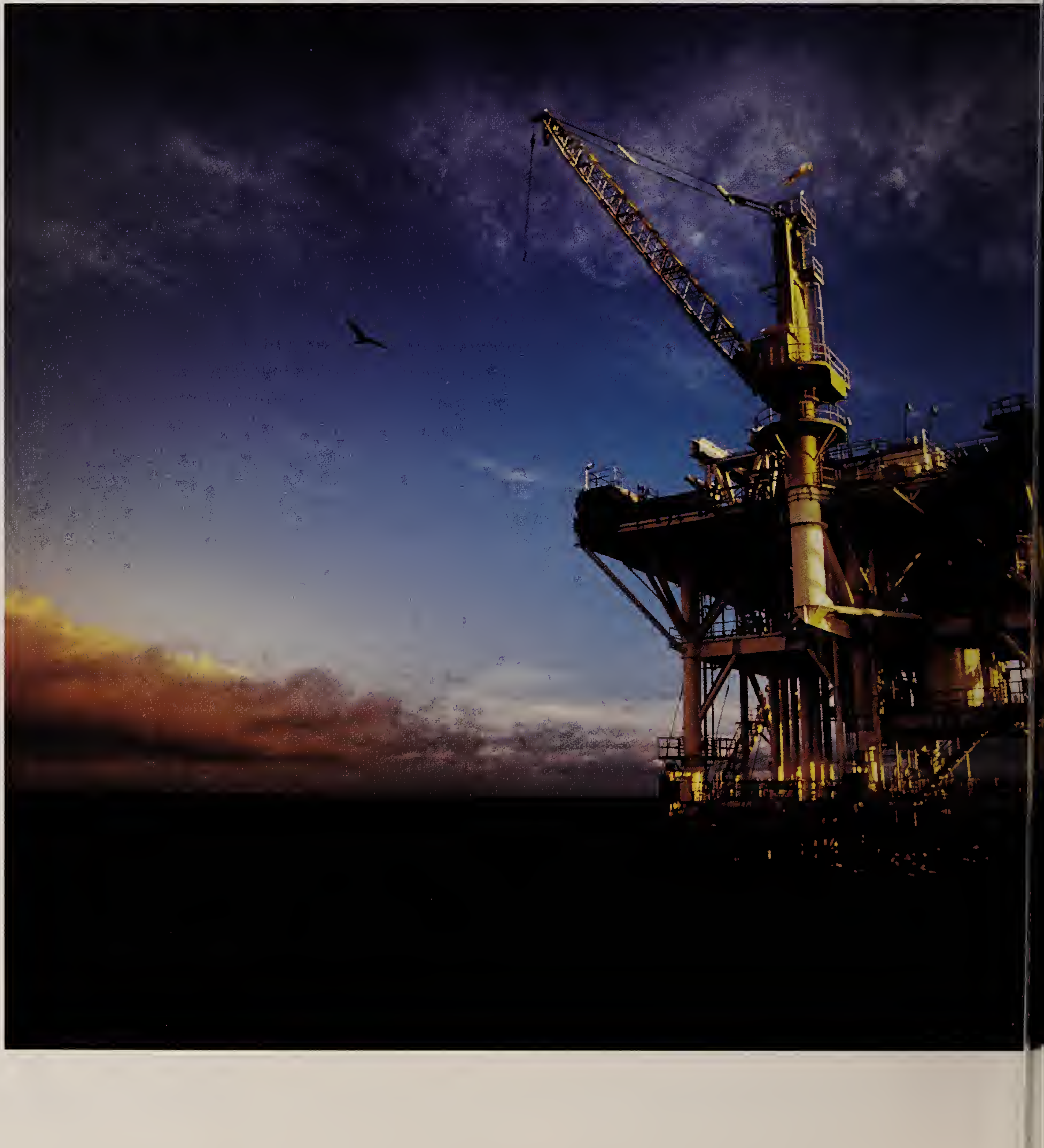

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THE KNOWLEDGE ENTERPRISE

INFORMATION MAPPING

Guiding Principles

Knowledge is a valuable asset, but not if you can't find it when you need it. Increasingly, organizations are creating "maps" of their intellectual assets and letting them guide the way.

BY CAROL HILDEBRAND

IN THIS AGE OF THE KNOWLEDGE CORPORATION, few would deny the importance of intellectual capital as a critical corporate asset. But while such companies say they live and die by what they know, their knowledge does not always extend to the whereabouts of that information. Not many firms have taken the time to draw a detailed picture of the skills, expertise and information (both paper- and human-based) that make up their pool of knowledge. Instead, for many—particularly large, decentralized operations—locating internal expertise can plunge a company back into the days of the early explorers. Navigators have only such rudimentary guides as the organizational chart—which, for these purposes, is about as useful as the medieval map, with its distorted land masses, inaccurate scales and sea monsters.

An organizational chart may tell you that Obediah Jones is an HR systems analyst, but it won't let you know that Jones has also spent three years examining supply-chain practices. Too bad, because many experts and practitioners say that the relatively small investment involved in creating what is known as a "knowledge map" can reap rich gains in increased productivity.

"Every organization has a pretty substantial amount of knowledge around it, and a lot of money has probably been spent on creating some of this information," points out knowledge-management authority Thomas Davenport, director of the information systems management program at the University of Texas at Austin. "The value of mapping is to help people find [information]. It's the number-one rule of resource management."

Like the term client/server computing, knowledge maps cannot be summed up in a

SPECIAL ISSUE ICON BY JEAN TUTTLE

ILLUSTRATION BY LISA ADAMS

single definition, since different companies build them to fit different needs. At its best, a knowledge map is an easy-to-use guide that shows knowledge workers the straightest path to pockets of expertise in a company. Because many components, such as searchable databases, exist online, most folks think that maps are the province of IT. The truth, however, is that a corporate knowledge map does not have to reside in bits and bytes.

McKinsey & Co. Inc.'s first efforts, in the early '80s, were built on paper. The map provided a guide to experts in different practices within the consultancy. (The company now depends on Lotus Notes applications as a navigational tool.) American Express' early map was just that—a map, says Cornelius F. Burk, co-author of *InfoMap, a Complete Guide to Discovering Corporate Information Resources* (Prentice Hall, 1988). "They had a map of the United States, and they pinpointed the location of different information resources within the company on it," he says.

Indeed, maps can range from simple directories of names, titles and department affiliation to elaborate online search engines with hypertext links to databases of human expertise, research material and abstracts of published information.

No matter what form a company's map takes, the point is to be able to get there from here. For example, say Don E. from marketing needs information on a competitor. His company's map—an online research tool—points to areas of expertise across the company. By searching on key words, such as the competitor's name, he finds that Alice K. over in quality control did some research on production methods of the competition. Don would never have found this link by asking his neighbor, "Hey, do you know anything about Company X?"

While timely, the idea of information cartography is not new. Davenport says that interest in knowledge mapping grew out of resource management initiatives in the late '70s and early '80s. Not surprisingly, some of the earliest adopters were consulting firms, whose main stock in trade is knowledge. Companies such as McKinsey & Co., KPMG Peat Marwick, Coopers & Lybrand LLP and Andersen Consulting all boast systems of online signposts to internal expertise.

Organizations that do devote time and effort to charting the geography of information are finding that a relatively small investment can yield some big benefits. Companies can respond faster to business imperatives if workers are able to cut research time by knowing who in the company may have already done the same work. Instead of "losing the recipe," as Arian Ward, leader of learning and change at El Segundo, Calif.-based Hughes Space and Communications, calls it, employees can draw upon the experience of colleagues who have already solved a particular problem.

Knowledge maps also let the left hand know what the right hand is doing. Say your marketing department has created a fascinating demographic database of customer buying habits. If sales personnel knew about the research, they could use it too. But without some sort of mechanism that tells the sales group of the initiative, not only do both groups miss an opportunity to learn, but the sales department may end up creating a similar—and redundant—project.

SINCE KNOWLEDGE MAPS by their very nature deal with cross-function expertise, there is no de facto standard when it comes to who does the map building, says Laurence Prusak, a principal at Ernst & Young's Center for Business Innovation in Cambridge, Mass. Prusak says he most often sees information cartographers come from marketing, strategic planning and IS. "Marketing tends to be very interested in making information overt, while strategists like to map the core capabilities of a firm to learn what still needs to be learned. IS has the systemic thinking style that one often needs to get [a map] right," he says.

Figuring out what exactly to put on the map can be a knotty problem. Davenport says that it's a mind-boggling task to map everything in an organization. Instead, he suggests picking a starting point based on the nature of your company and internal demand for a map. For example, he says, "if I were in a consulting firm where people are experts, I'd want to create a map to the knowledge in people's heads."

Once you've got the area to be mapped, survey employees by asking "What information do you depend on to do your job?" suggests Burk. (See related story, below.) That information can range from high-tech sources like databases to the far more common informal social network of colleagues who provide expertise. Davenport suggests starting with upper-middle managers such as department heads and asking what kind of information sources—paper and human—they

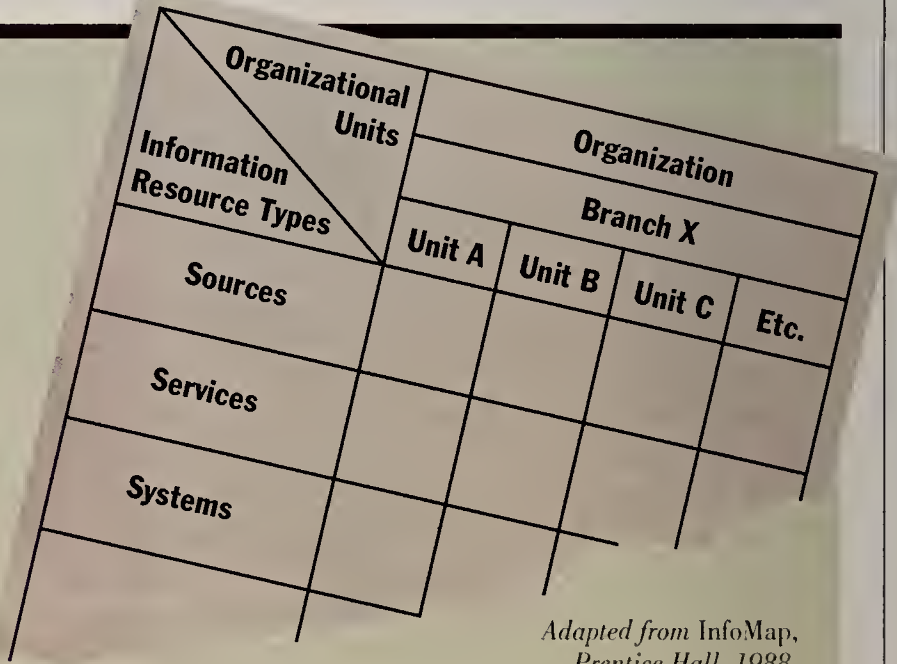
The Fact-Finding Mission

Before you can build a map, you must find out what your company knows

EXECUTIVES TRYING TO TAKE an inventory of informational resources within a company may want to use an approach advocated by Cornelius F. Burk and Forest W. Horton in *InfoMap, a Complete Guide to Discovering Corporate Information Resources* (Prentice Hall, 1988). The authors categorize such resources into sources, systems and services.

- **A source** is a place, store or person (like a co-worker, newspaper or online document) that employees can access for information.

- **A service** is an activity, such as a commercial research service, that is helpful in getting ahold of information.



Adapted from InfoMap, *Prentice Hall, 1988.*

- **A system** is a structured, often repetitive process for handling information and data (a payroll system, for example).

By using these categories to survey company employees, map builders can create a chart (see above) that helps pinpoint who provides information, who uses it and how. *–C. Hildebrand*

DIAGRAM BY CHRISTINA WILLIAMS

use. "You end up with what sociologists call a snowball sample," he says. "[The managers] tend to have a fairly low level of understanding of that kind of thing, but they direct you to people who understand, and *they'll* tell you people, and so on."

AT&T's Martin Stark, strategic planning manager at the Basking Ridge, N.J., telecommunications giant, started his online directory of expertise with 200 volunteers. Inclusion in the directory is still purely voluntary, but Stark says that its 2,000 contact names represent nearly every part of the company. "If we had 300,000 names, it's not clear that it would be more useful than the 2,000 list," he says. Users of Stark's directory can post queries on bulletin boards (a "pull" versus "push" method of mapping, he says), search lists of names and associated areas of interest, and then query any of the people who pop out of such a search.

When it comes time to build the map, it's important to spend considerable time on design and research (see related story, Page 64). Maps should first of all be easy to use. For example, Coopers & Lybrand employees access their directory of expertise by calling 1-800-KNOW-HOW and interacting with a human knowledge researcher who uses a Notes database to find the proper internal expert.

Knowledge cartographers should also pay attention to how information is categorized. If information is not where users expect it to be, they'll be loath to use the map. It's like looking in the Yellow Pages for a taxi, only to find that such vehicles are listed under hackney service. Davenport points out that when he was working on reengineering at Ernst & Young years ago, the company's map did not yet contain such a topic; colleagues looking for an expert in that field wouldn't even have had a ground zero from which to start searching.

Finally, mappers should avoid putting everything online. Drawing a picture or creating a directory of internal experts is fine—just don't try to download the cranial database into an online counterpart. "What we want are the things in people's heads," Ward explains. "It would be arrogant for IT to try to re-create knowledge."

To that end, Ward is building an online map to Hughes' "knowledge highway—a human network supported by technology when possible." Ward is not attempting to map every piece of knowledge in his company, because, like Davenport, he suspects that would be an exercise in futility. Rather, he starts with areas that "scream to be mapped." One of his first efforts was the map of the "lessons learned" database in the engineering group. The map is an online search tool with hypertext links to databases, directories of human expertise, and abstracts and full text of published material. An engineer researching regulatory changes that affect Hughes' bread-and-butter business of building communications satellites might turn up the name of an engineer who has worked on a similar problem or a paper noting such changes. The "map," or search tool, will then fetch the pertinent material and present it on the desktop.

A**LTHOUGH UPFRONT PLANNING** and design are important, even the best laid-out maps will suffer a slow death by disinterest if the contents are not frequently refreshed. An engineer looking for somebody to tell him about metal coatings is not going to check his company's knowledge map if his last three attempts came up with only outdated information. Map maintenance is a high-nuisance chore, but like a home page on the World Wide Web, the nature of the beast demands accurate, fresh material. Ward tells the story of one of the earliest maps he ran across, a directory of expertise at a large financial services company. Although it started out well, the company was unable to keep the map current. Now, he says, "it's just not usable anymore. Unfortunately, there's no silver bullet for maintenance."

You can, however, make the experience a little less painful, says Marc Linder, vice president in the corporate systems and architecture group at Chemical Bank in New York. Rather than having line managers submit paper forms every time they want IS to update the corporate expertise directory—which is available in both hard copy and electronic form—his group is pushing the ability to update the directory out to the local level. That way, he says, "the source of the change will be able to go in and make the update," cutting down on paper rustling in the process. Says Linder, "It's unrealistic to have a central process responsible for local information."

Linder is lucky; he is confident that given his company's culture, employees will keep the database current once they have access. However, for others, maintaining an accurate map means not only the physical chore of changing the information but also coaxing busy employees to submit changes or list areas of expertise in the first place. Stark resorts to both material and intellectual bribery to keep his database of internal expertise from growing stale. "We give away flashlights and keychains and the like," he says. "But we'll also share relevant research that people might be interested in." Stark's tactics work: He reports a response rate of better than 70 percent to his thrice-yearly update requests.

Teltech Resource Network Corp. in Minneapolis takes it one step further (see "Experts for Hire," *CIO*, April 15, 1995). The staffers who maintain the company's KnowledgeScope, an online thesaurus of technical terms and experts, are in charge of shaping the 'Scope's content and innards. Instead of simply performing data entry, the group solicits input from everyone in the company to make sure that the information will be useful to customers. Of course, Teltech has a vested interest in maintaining its thesaurus. The company's main source of revenue is referring clients to outside sources of expertise—rather like a knowledge map for hire.

Since a certain degree of information in a good knowledge company will inevitably reside in employee gray matter, keeping abreast of changes in human experience adds a certain political element to the task as a multitude of differing personalities and attitudes become involved.

If You Build It…

Companies that plan before they build have the best chance of success. Here are some tips that will help you draft a perfect map.

Start small. "Pick an area important to the business—say, customer information—and map that first," advises Thomas Davenport, director of the information systems management program at the University of Texas at Austin.

Focus on quality. "We were less focused on growth and more on helping people find the contacts they need," says Martin Stark, strategic planning manager at AT&T in Basking Ridge, N.J.

Make it easy. "The system has to be very intuitive and easy to use, or it won't get universal acceptance," says John McFadden, vice president of applications systems development at Chemical Bank in New York. Studies have shown that people are not likely to go much farther than 40 feet from their desks in search of information, so desktop access is a key ease-of-use feature.

Categorize and define the information. "One of the toughest tasks we're faced with is determining what we actually want to pull into the system," says Arian Ward, leader of learning and change at Hughes Space and Communications in El Segundo, Calif. Davenport advises companies to make sure that the categories of expertise in a knowledge map actually reflect the information in company noggins.

Involve the corporate library. Ward says this is one of the first things he did—both to collaborate with and to learn from the librarians.

Push and pull information. While users should always be able to navigate the map on their own, having information sent to their desktops will ensure continued interest. Bruce Young, senior vice president for emerging technologies and advanced concepts at NationsBank in Charlotte, N.C., employs human intelligent agents responsible for dispatching information on a particular technology—voice recognition, for example—to interested parties.

–C. Hildebrand

Ted Lumley, chief of technical computing at Mobil Exploration and Producing in Dallas, ran into this problem back in 1987, when his group tried to set up a directory of employee experience and capabilities, including a thumbnail rating of how much expertise each individual had in a particular area. "There were a lot of politics associated with who divines who has the most expertise," he says. Although the group first had a third party make the evaluations, it then tried to let people rate themselves. Unfortunately, he says, "the experts were modest about their capabilities, and the neophytes overestimated theirs." Lumley created another map in 1992 that sidestepped the experter-than-thou element by dropping the ratings altogether.

Human nature also manifests itself as corporate culture, another factor to consider when building informational directional signals. While supportive cultures such as those of McKinsey and other knowledge-intensive firms encourage workers to share their expertise, many corporate map makers run smack into a culture that is suspicious of such collaborative knowledge projects. "The concept of laying informational nuggets right out on the table where everybody can pick them up and carry them off is a difficult one for many companies," says Bruce Young, senior vice president for emerging technologies and advanced concepts at NationsBank in Charlotte, N.C. "Most think in terms of individual power rather than team power."

NationsBank's network is a series of searchable factual databases and Lotus Notes-based discussion groups and bulletin boards. Young says it helps that management is very active in making sure employees contribute. "It's a form of moral suasion," he says. "If I travel, for example, I have an obligation to make sure that my observations are posted in a database. If I don't, I'll probably hear how eagerly my boss is anticipating my trip notes." His boss then sends weekly messages mentioning new items on the network.

Such a sea change in culture for most companies demands an enterprisewide effort, most experts agree; map makers cannot be the sole drivers. They can, however, use mapping and its benefits to heighten use of knowledge management efforts within a company. But first, information trackers must heighten the awareness of maps themselves.

When Hughes' Ward tried to publicize the company's knowledge highway, he had a hard time alerting folks to what was out there. Since company newsletters are often ignored, his group held a "Knowledge Fair," where attendees could cruise the booths and take a gander at Hughes' knowledge capabilities, from Notes databases to human intelligent agents. Ward also recruits individuals he calls "brokers" to spread the word; these are "networked people with lots of connections who know what's going on," he says.

Stark favors the one-on-one approach: "I've done mailings and put articles in newsletters, but demos are most effective. When somebody actually sits down and uses our system, it's much easier" to see the benefits.

Although the benefits of increased productivity and better-researched projects should be obvious, it's hard to quantify the ROI of knowledge mapping. "If a company spends $500 million a year on information, one would think it would be worth $100,000 or so to create some sort of inventory," says Davenport. "But it's easier to map a better future than a messy present."

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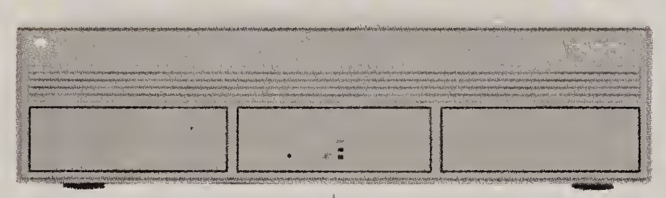

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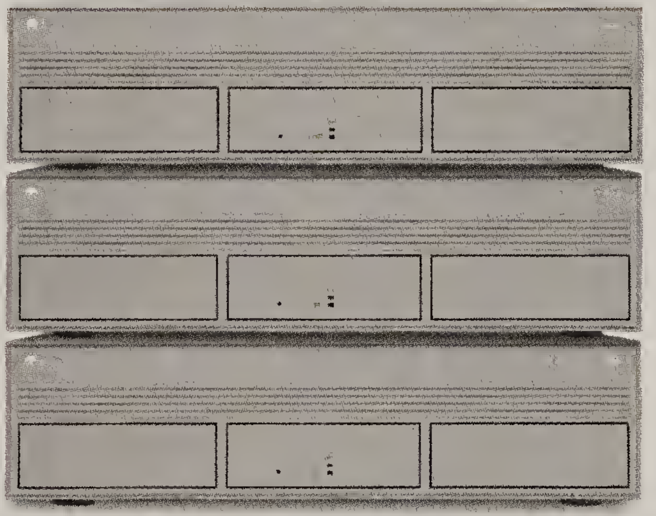

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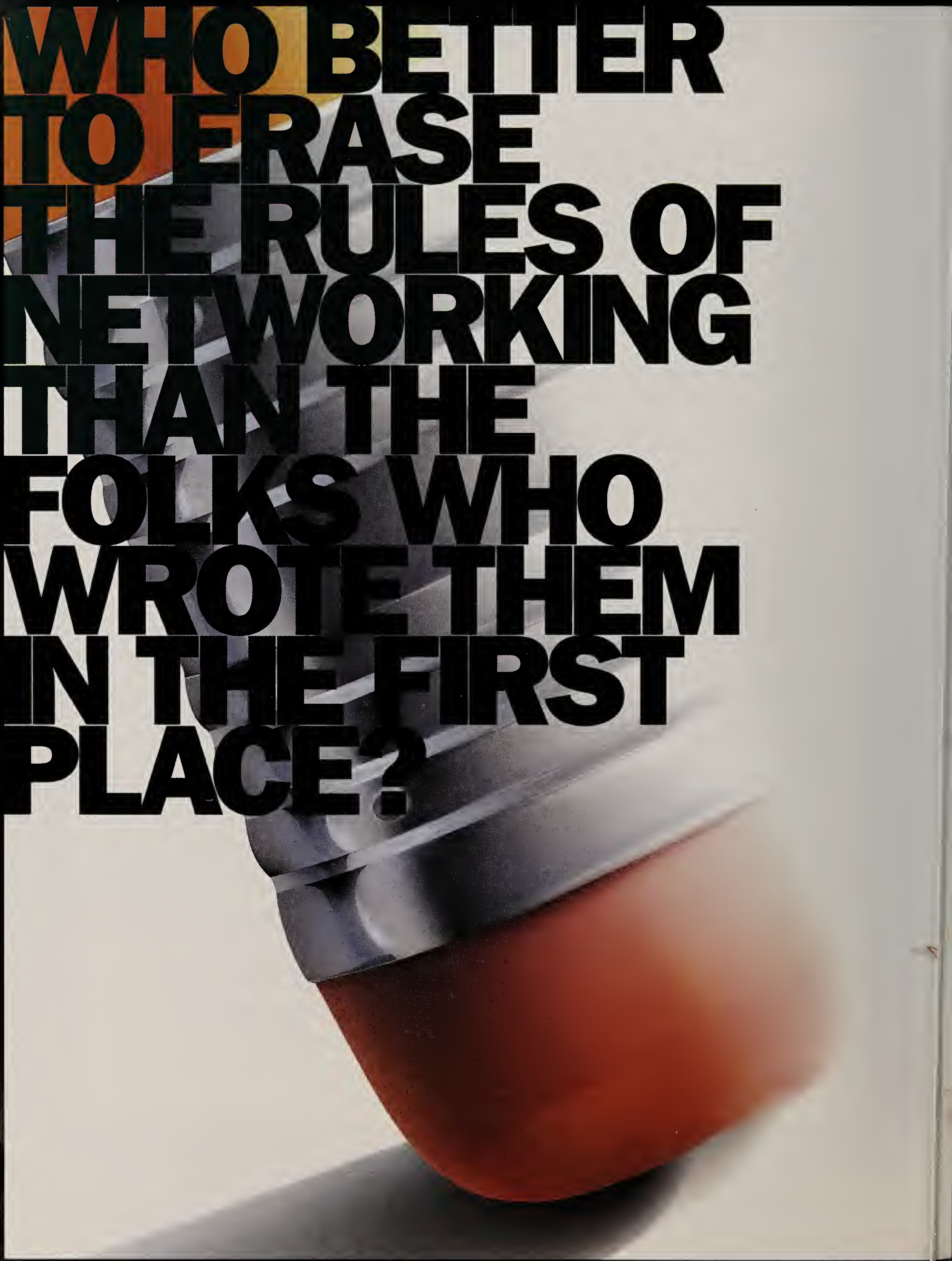
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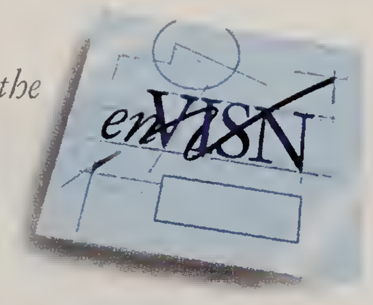

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THE KNOWLEDGE ENTERPRISE

THE CIO ROLE

The Medium and the Message

Whatever approach a company takes to merging content (information) and its delivery mechanisms (technology), the CIO is in the perfect position to preside over the marriage

BY LEIGH BUCHANAN

PETER DRUCKER AND HIS ILK have been doing a lot of finger wagging at CIOs lately. Casting technology in the role of information's poor relation, they admonish IS executives for paying too much attention to those infamous "bits and bytes," a phrase increasingly used as an epithet.

When cornered on the issue, many of these big thinkers will throw up their hands and protest that they're not Luddites; they love information technology like their own gray-haired mothers and recognize all that IT can do for organizations. Tools like data warehousing and data mining provide users with heaps of pertinent information in an easy-to-understand format. Executive-information and decision-support systems increase the relevance, timeliness and usability of information while tracking early warning indicators, competitive moves and customer demands. E-mail, Lotus Notes and other groupware tools allow users to communicate rapidly and exchange information with people in the know.

But...

Information technology cannot deliver on the one overwhelming mandate of users. It cannot—by itself—transform data into knowledge. That is an inherently human process, these experts say, and who is better positioned to handle it than the people with "information" already in their titles?

Arguably, the provision of information is a more interesting and strategic problem than the provision of information systems. "Nobody can say they're not interested in how to make effective use of information," says Thomas H. Davenport, director of the Information Systems Management Program at the University of Texas in Austin

SPECIAL ISSUE ICON BY JEAN TUTTLE

PHOTO BY ALLEN MIMS

VICTOR BAILLARGEON: "WE EXIST TO TRANSFER KNOWLEDGE, NOT TO HAVE A SMOOTH-RUNNING MAINFRAME."

and a research fellow at Ernst & Young's Center for Information Technology and Strategy. "You can't become a successful executive unless you've mastered that to some degree." On the other hand, "there's an awful lot of people who can get by with saying, 'I'm not interested in how we run the data center. As long as it's reliable, we just pump the stuff out.'"

Jessica Keyes, president of New York-based consultancy New Art Inc., agrees about the primacy of information. But she takes issue with the criticism that IS is too techno-centric, something she says has not been true for at least a decade. "There's no one today in IT, including the centralized group, that doesn't think about information," says Keyes. "How can you not? It's all anyone talks about."

As a former IS practitioner at Bankers Trust Co., Keyes believes she has a more informed perspective on the subject than someone like Drucker, "who I think is marvelous but not close to the situation." She says that client/server and IS decentralization have created a situation where "everyone has become an expert in a vertical area. If you're [in IS] in a retail environment, you know just as much [about the business] as the end users."

Whether CIOs are pursuing a broad information vision or trotting down the road wearing technology blinkers is probably a matter of how their companies interpret the position. Candidates who go into a job interview proclaiming their desire to influence strategic direction only to be grilled exclusively on their client/server development skills shouldn't be surprised if they end up as part of the corporate underclass. But when companies are willing to rethink the IT function as a symbiosis of content and content-delivery concerns, CIOs have a chance to become something more than

"The latest and greatest and freshest solutions to customer problems reside in the minds of individuals, not in some report or database."

-VICTOR BAILLARGEON

garden-variety technology managers. In some cases, the model of an information officer presiding over a technology function is replaced by a hybrid figure with fingers in a number of information and information technology pies.

The following profiles demonstrate four different approaches to merging what Davenport calls "the water and the pipes" of information. All the subjects bear some responsibility for technology strategy, and all are intimately concerned with defining their companies' information needs. While their positions are largely nontraditional, their success in those positions reminds us that exceptions are possible, and that rules are made to be changed.

VICTOR BAILLARGEON: BUCKMAN LABORATORIES

VICTOR BAILLARGEON'S title is a mission statement in itself. As vice president of knowledge transfer for Buckman Laboratories International Inc., a specialty chemical company based in Memphis, Tenn., he heads a potent amalgam of the IS, telecommunications and library functions dedicated to "unleashing the expertise of the organization," Baillargeon says.

At Buckman, that goal is achieved through an information-age twist on utilitarianism: The greatest good derives from the greatest amount of information delivered to the greatest number of people. It's a far cry from the situation 10 years ago, when management considered putting a locked security door on the R&D wing to keep people out.

In those days, IS was no threat to the isolationist mentality, spending most of its time "converting from one mainframe system to another mainframe system," says Baillargeon. "There was nearly a two-year period where systems and communications didn't really improve for our end users."

Then in the mid-1980s, the company's CEO, Robert H. Buckman, began to emphasize the virtues of sharing and communication. Baillargeon, a chemist by training who was hired to computerize R&D and later became Buckman's assistant and philosophical twin, took over the newly created Knowledge Transfer Department (KTD) in 1991.

"Our name brings focus to the fact that we exist to transfer knowledge, not to have a smooth-running mainframe," says Baillargeon. "The latest and greatest and freshest solutions to customer problems reside in the minds of individuals, not in some report or database."

In the initial push to open up communications, a handful of employees armed with airline tickets and laptops had set out to preach best practices to Buckman's far-flung affiliates. But the CEO believed IT was destined to perform this role, and he charged Baillargeon with making it happen. Convinced that spending a fortune on new in-house systems wasn't the way to go, Baillargeon instead looked to the emerging world of commercial online information services. He selected CompuServe, based in Columbus, Ohio, as the company's network, both for its reach and its easy-to-use e-mail system. All 1,200 of the company's employees worldwide have CompuServe IDs and passwords (though only about 1,000 have their own PCs), and they use the network for both intra- and intercompany communication.

But knowledge transfer is more than just a fancy name for e-mail: Baillargeon wanted to transform the company into an ongoing information bazaar. So his department created a private forum on CompuServe, accessible only by the company's associates and broken down into sections based on Buckman's lines of business, such as water treatment and pulp and paper. The Knowledge Information Center (KIC)—a souped-up corporate library that draws on both paper-based sources and online databases to provide information retrieval and support for the whole company—seeded the forum with information, and the KTD hired two full-time "forum specialists" to monitor the sections. "They read everything, and if a question gets posted and sits there for 24 hours without a reply, the forum specialist will intervene and get someone participating," Baillargeon explains.

Baillargeon says the average user logs onto the forum three to five times a week to ask questions, read up on what others are doing or report intelligence picked up in the field. "The usage has matured tremendously; in the early days there was a lot of chitchat and people saying thank you for the

JANE LINDER: "I'VE ALWAYS BEEN A BRIDGE PERSON. I COULD NEVER UNDERSTAND WHY YOU'D WANT TO DO SOMETHING UNLESS YOU HAD SOME BUSINESS USE FOR IT."

PHOTO BY MICHAEL LUTCH

information and then thank you for your thank you and so on," he says. "Now people make much better judgments about when an exchange between individuals is more appropriate for a quick e-mail and when it could be of value to others in the organization." (The KTD has also created a "break room" section for the inevitable discussions of politics and pets.)

Another advantage of the forum model is that it is easily converted into institutional memory. Content can be downloaded to individual PCs, and the company has been moving valuable conversations from the message-posting area into a library resource provided by CompuServe (experts within the individual sections advise the two forum specialists on which exchanges—or "threads"—are worth saving). Baillargeon is now working on bringing that database in-house and adding a full-text search capability to make it more useful.

Baillargeon and the KIC are also looking at new ways of gathering competitive information to post on the forum and working out the copyright kinks that prevent them from using some of the information they already have. And to make sure his staff remains focused on the company's real-world concerns, Baillargeon insists that everyone—regardless of position—spend a week in Buckman's sales-training program. "It helps us understand [the salespeople's] methodology and their language," says Baillargeon, who has himself taken the course. "And it gives them a chance to know some techies, so it humanizes us."

JANE LINDER: POLAROID CORP.

JANE LINDER has one of those jobs that, like certain exotic dishes, is best described in terms of what goes into it. As director of business development for Polaroid Graphics Imaging, a division of Polaroid Corp., she's responsible for information management, market research, competitive intelligence, business strategy and new-product conceptualization. It's a position that was created to some extent for and around her, meshing her strong understanding of what IT can do with her even stronger opinions of how it ought to be applied.

"In the past we've spent a lot of time and energy gathering, manipulating and reporting data, and very little making the connection between data and action," says Linder. "I want to concentrate less on the library and transaction-flow functions and more on the critical drivers and implications of information."

> **"Information-management professionals have to be willing to take accountability for a piece of analysis that doesn't have a computer attached to it."**
>
> **–JANE LINDER**

Until 18 months ago, Linder was the senior manager responsible for the management information team at the Cambridge, Mass.-based company. It was a pretty traditional technology-management position, but Linder is not a traditional technology manager. With a bachelor's degree in sociology and an

RACING
8

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M.B.A. and doctorate in business administration from Harvard, "I've always been a bridge person," she says. "I could never understand why you'd want to do something technically unless you had some business use for it, so I was always working both sides of the equation."

In her new position, Linder is responsible for both sides of an equation so complex it occasionally resembles Fermat's Theorem. She got the job, she explains, after completing a competitive-intelligence project for the new unit's president. When she proposed the project, "I was thinking largely of tools, but to pull it off I had to get into content."

Now her concerns are almost all content-related, although she does oversee some relevant IT implementations, including a Lotus Notes application for competitive intelligence. "I'll sit with the people who are working on that to make sure the design is right," she explains. "In my free time, I may put data in to make sure it works. But am I actually writing code myself? No."

Instead, she may be exploring partnership opportunities for her business unit or prowling for product ideas. Since the graphic-arts field is new to her, she spends considerable time reading and attending trade shows, and she is also responsible for collecting business plans from the disparate parts of her unit and stitching them into a coherent whole. And because the unit may need a new system for managing customer relationships, "I'm working with other people to make sure that issue gets raised and that we get someone to do the work and move it forward," says Linder.

Linder is so focused on analyzing information that she happily outsources much of the gathering activity, hiring firms like the Teltech Resource Network Corp. in Minneapolis to prepare profiles on potential customers or competitors (see "Experts for Hire," *CIO*, April 15, 1995). "We'll put down a bit of money, save ourselves a lot of time and concentrate on what the data means," she says. "It elevates our part of the work to a higher value added."

> **Old ways of doing technology have focused on "information distribution—getting stuff out lickety-split"—to the exclusion of "how do you get information into people's heads?" There's something very powerful going on in the information-transfer process that MTV and Nickelodeon use.**
>
> **-BOB WALKER**

While Linder's is not yet a well-trodden career path, she is convinced that IS professionals with M.B.A.s will increasingly head in that direction. "Every information-management professional who pushes back on an information request and says, 'Let me understand how you're going to use this data,' is moving this way," says Linder. "But they have to be willing to take accountability for a piece of analysis that doesn't have a computer attached to it."

BOB WALKER: HEWLETT-PACKARD CO.

OF THE FOUR SUBJECTS profiled here, Bob Walker of Hewlett-Packard Co. is the closest thing to a traditional CIO. His title is director of corporate information systems; he heads a systems organization rather than some eclectic stew of info-functions; and his conversation repeatedly strays back to the importance of having a "rich and complete infrastructure."

At the same time, Walker is an enthusiastic participant in Ernst & Young's forums on information and knowledge management, and when he makes decisions about that infrastructure, he is probably considering things like organizational learning and how people synthesize unstructured information. For example, he's been thinking a lot about multimedia recently, not because it allows managers to make slicker presentations but because he wants to prepare Hewlett-Packard for a wave of new employees who have grown up with "very high burst-rate forms of communication"—like MTV and video games.

"It's easy for some of us who grew up listening to lectures and reading books to dismiss that generation," says Walker. But the multimedia experience speaks to his concern that old ways of doing technology have focused on "information distribution—getting stuff out lickety-split"—to the exclusion of "how do you get information into people's heads?" Walker explains. "If we understand the information-transfer process that MTV and Nickelodeon use, there's something very powerful going on there."

But it's not just getting things into people's heads, it's also making sure they're the right things at the right time. Unlike some, Walker eschews the notion that you can't be too rich, too thin or have too much information. To illustrate that point, he tells the story of one of the company's founders, William R.

Hewlett, visiting an HP fabrication facility and asking—just because he was curious—what the melting point of nickel was. Nobody knew, "and a great panic set in," says Walker. "And the semi-tragic ending of that story is, next year, everyone in that organization knew the melting point of nickel. It didn't help them in their jobs; it didn't help them make decisions. But they knew it."

Walker says the problem is exacerbated by technologies like e-mail that allow everybody to send everything to everybody else. "We deliver on an average working day at HP a million and a half electronic messages, and most people feel like they get the whole million and a half," he says. IS has responded with a document-management system that creates repositories for everything from the company's telephone directory to policy manuals and competitive intelligence. The information is downloaded every evening from HP's Palo Alto, Calif., headquarters to servers all over the world, "so people can pull it when they need it as opposed to having it pushed at them," says Walker.

He has also put mechanisms in place to keep information fresh, measuring how long documents sit out—and how often they are accessed. "We don't want to just arbitrarily say we'll keep information around for three months," Walker explains. "Some ought to go out there for a week. Some should be out for several years." And to make sure the material is intelligently indexed, he has turned for help to the company's librarians. (Walker is also working with the library function to obtain from publishers full electronic—rather than merely scanned in—versions of important journals, which can then be subjected to full-text searches through a variety of engines.)

Currently, IS is in the process of converting the document-management system to a Web-server-and-browser model in order to make information access even easier. Such effective uses of leading-edge technology suggest that Drucker's emphasis on information over architecture may be somewhat misplaced, says Walker. "A thorough understanding of technology and technology trends is very important," he insists. "You can miss some very valuable technologies if you ignore them and focus just on the information."

BOB WALKER BELIEVES IN STRIKING A BALANCE: "YOU CAN MISS SOME VERY VALUABLE TECHNOLOGIES IF YOU IGNORE THEM AND FOCUS JUST ON THE INFORMATION."

PHOTO BY EDWARD CALDWELL

VINCENT B. BARABBA: GENERAL MOTORS CORP.

GENERAL MOTORS CORP. has, arguably, the most famous technology outsourcing arrangement of all time. After all, who doesn't know that GM owns Electronic Data Systems (EDS) and is also its largest client. But EDS implements systems; it doesn't establish systems requirements. Defining and then articulating those requirements is the job of GM's Strategic Decision Center (SDC), led by its general manager, Vincent B. Barabba.

When it comes to technology, Barabba describes himself as "an informed layman." When it comes to information, he is an expert. With a varied background that includes stints as the head of market research for Xerox and Kodak and as director of the U.S. Bureau of the Census, he has studied at great length the science of gathering information and the art of applying it. His book *Hearing the Voice of the Market* (Harvard Business School Press, 1991), co-authored with Gerald Zaltman, is a study of how behavioral factors affect "the acquisition, processing and application of information in the decision-making process." *Meeting of the Minds,* to be published by Harvard Business School Press in October, looks at knowledge gathering in the unrestructured organization (see "Scavenger Hunt," Page 38).

"Most people whose job it is to manage IT don't have the opportunity to get involved in what else is going on in the company," says Barabba, explaining the advantages of his position. At GM, the SDC acts as an umbrella for the decision-support, market-information, strategic-development and corporate information-management organizations. The last group develops IS policies and processes—the what and the why of systems management but not the how. "Because I'm involved in strategy development and market development, I've got a broader view," Barabba says. "When I sit down with the head of corporate information management, I can say, 'Hey, you should be aware of what's going on in this other area because I think it has implications for what you're developing.'"

> **"Most people whose job it is to manage IT don't have the opportunity to get involved in what else is going on in the company. Because I'm involved in strategy development and market development, I've got a broader view."**
>
> **–VINCENT B. BARABBA**

VINCENT B. BARABBA, ON INFORMATION AND TECHNOLOGY: "THERE AREN'T A LOT OF PEOPLE WHO CAN WALK IN BOTH SETS OF SHOES."

PHOTO BY JON MURESAN

Barabba believes the most crucial part of his job is just making sure that customers' requirements—both internal and external—are articulated clearly and early. "In this business, the value of getting it right upstream is very high because of the cost of designing and developing," he says.

As far as technology goes, Barabba has a solid understanding of what IT can do, and that's enough for him. "There aren't a lot of people who can walk in both sets of shoes," he says. He advises companies to divvy up the responsibilities for information and technology while making sure that both sides are sensitive to one another's concerns. "Then you design a process that allows those two knowledge sets to interact," he explains. "It's out of that dialogue that you get the really good ideas." CIO

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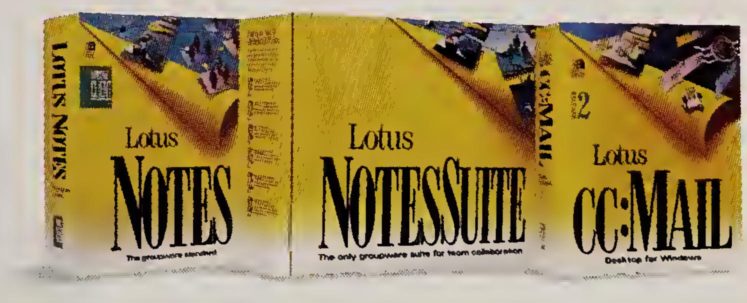

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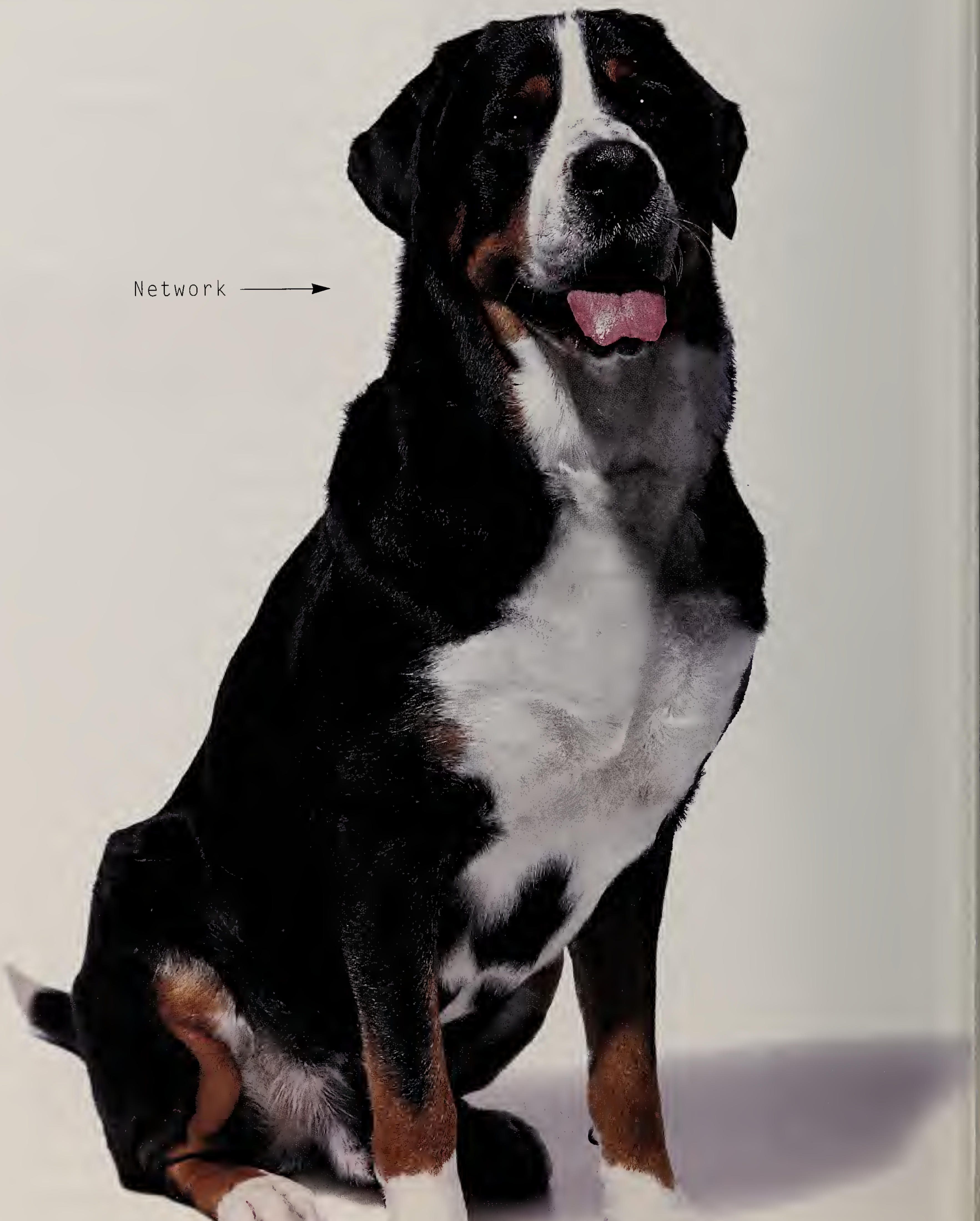

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The Outside Track

Meeting the growing demand for external information can be tricky. And the best way to track it will vary from one company to the next.

BY TRACY MAYOR

R. F Horton has a dream. "I can see a screen in front of my manager, and on it he has a news [icon]. He clicks on it, and it's a news filter just for him. He clicks on another area, and that deals with management issues. He clicks again, and he's reading a discussion group from CompuServe."

On the other half of this dream screen is corporate information, explains Horton, director of information management at the Airports Group of Transport Canada, the federal government transportation agency based in Ottawa. From Horton's manager's point of view, he's looking at information, filtered, edited and presented in ways that are relevant to him. "It shouldn't matter [to the end user] where the data comes from," Horton says.

Sounds like the promises served up five years ago by vendors hawking executive-information systems? It is, with a twist: Now a growing percentage of the information that workers want to see is external to the corporation. Many companies have successfully turned to EISs or popular tools like Lotus Notes, middleware packages or graphical database front ends to deliver internal data in a useful format to their employees. But when it comes to identifying and routing external information, catch as catch can is still the byword in most organizations.

The situation only stands to get more convoluted as workers, anxious that they're missing out on the purported information explosion, demand equal access to external data from myriad sources: commercial online services, the Internet, public and private research databases, newsletters, journals, trade magazines, user forums, electronically connected colleagues, CD-ROMs and, yes, even hide-bound, hard-cover reference books.

In the face of such an onslaught, IS managers understandably may be tempted to choose one or two sources and slam the door on the rest. But information brokers, corporate librarians and online researchers advise against such a policy. It's important to have some measure of control over what type and how much information flows into the company, they say, but for now, no one source—not even the much-touted Internet—can provide the proper mix of financial, competitive, industry-specific and technological data needed to ensure the informational health of a company.

The Self-Informing Workforce

Maureen Farrell, a principal of Business Information Associates in Swampscott, Mass., makes a distinction between daily information needs and specific, project-based research. For deep research into a narrowly defined topic, firms might turn to companies like Farrell's, which provides database research services and works with companies to develop self-sustaining information strategies. Such companies access a variety of highly specific, powerful and typically expensive online databases that end users would be unable to navigate effectively.

But for a broad base of general business data, Farrell says, managers can construct a plan to help employees keep themselves up-to-date in their field. For example, at one of her client sites, a high-technology hardware company, "everyone feels like they're always behind,

ILLUSTRATION BY TIM CLARK

so I built an action plan for staying on top of things." Farrell's prescription for managers there includes the front page of *The Wall Street Journal* every day, plus a scan of its table of contents to identify relevant articles; a variety of industry-specific weekly and monthly business publications (such as *Datamation*, *Business Week*, *Computerworld*, one of the Patricia Seybold Group industry newsletters and *Information Week*); *Forbes* and *Fortune* for financial information; *The Fidelity Monitor* newsletter for retirement-fund data; and at least two local business publications (in this case, *Mass Business* and *The Boston Business Journal*). She also recommends a monthly scan, using relevant key words, of the *Computer Select* CD-ROM of computer-related articles. In addition, Farrell herself distributes via e-mail and posts on a centrally located bulletin board a monthly compilation of interesting articles that employees may have missed.

Databases such as Dialog, Nexis and Lexis, which were built for use by librarians, sport sophisticated search engines that let experienced users dig deeply to find the data they need. Novices can still negotiate the database but won't be able to add the kind of value that an experienced corporate librarian does.

Online Information

When Farrell needs to perform indepth, comprehensive research on a specific business topic, she turns most often to commercial online services, which offer "about 80 percent" of what she's looking for, she says. Knight-Ridder Information's service Dialog (formerly Dialog Information Services) is her number-one choice for turning up data that "you just can't find anywhere else or without great difficulty," some of which is in abstracted form. Lexis and Nexis offer a slightly narrower scope of information, Farrell says, but do provide full text of every article indexed, which can be a big help.

These better-established databases, which were built for use by librarians, sport powerful and sophisticated search engines that let experienced users dig deeply to find the data they need. Novices can still negotiate the database but won't be able to add the kind of value that an experienced corporate librarian or information broker does. "A couple of days of training is not going to get you what you need," says Farrell, explaining that a knowledgeable researcher will cull through whatever comes up, edit out what doesn't apply, highlight articles that are particularly on-target, note which volumes or journals are available in the corporate library and suggest broader or ancillary searches.

Farrell says a more commercially oriented service like CompuServe isn't specific enough for her needs but may be of use for more-generalized searches. Transport Canada's Horton says he has found a few "hidden" gems on CompuServe that deliver the news he's looking for, particularly the Monitor News, part of CompuServe's Online Today service.

Researchers say that the greatest strength of CompuServe, which positions itself as the business person's online service, is its subscribers: The service boasts a healthy and ever-expanding array of professional-interest forums on subjects ranging from aviation and business management to international trade and journalism. These forums can be an efficient and personal way to get a question answered, solicit advice from far-flung colleagues, keep up with industry-specific news and, in some cases, gossip.

Mining the Internet

This type of peer-to-peer connection is one that organizations often overlook or undervalue when considering their information sources, says Jean Graef, a principal with The Montague Institute in Montague, Mass., an Internet training and consulting firm. "People resources are free and to the point," Graef says. "You can e-mail a message to an individual or to a user group" on the Internet and get back replies that address your specific circumstances. Graef herself, for example, finds invaluable her participation in an Internet discussion group for business librarians, which includes some 1,000 people. (See "E-Mail Bonding," *CIO*, June 1, 1995.)

CompuServe forums can be an efficient and personal way to get a question answered, solicit advice from far-flung colleagues, keep up with industry-specific news and, in some cases, gossip.

And the ubiquity of e-mail connections means a potential contact doesn't necessarily need to be participating in such a group. Nearly all commercial mail services now offer gateways to the Internet, so it's very likely an individual can use e-mail to reach anyone from an author or editor to a conference speaker to an academic who has done research in a particular area. Correspondents who are polite and to the point and follow the proper "netiquette" can often turn up surprisingly helpful results.

Graef lists two other principal benefits that organizations can derive from maintaining an Internet account: access to published material and a single-connection hookup to commercial services. The online market for published material is beginning to open up slightly, Graef says, though by no means is the vast majority of published data yet available over the Net. "When it comes to noncommercial published material, this is where the ground is sort of shifting," she explains.

"You used to have to go to a commercial service to get published material, but now some things, some government stuff, for example, is free. SEC data used to cost an arm and a leg from Dialog; now you can get it from the EDGAR site on the Internet" (*http://town.hall.org/edgar/edgar.html*).

Data culled directly from the Internet can be "more current and less expensive" than what commercial databases offer, but "the flip side is it may be harder to find that tidbit of information," Graef says. Until a much larger chunk of published information makes its way to the Internet, and until the Internet's search tools become more refined, corporations shouldn't yet drop their commercial service connections—but they can make it more cost-effective by accessing such services through a single Internet account, Graef says. "Telecom costs can be less than half of what they would be if you dialed into Dialog directly."

Those bold enough to troll the Internet themselves can perform key word searches using Gopher, Galaxy, Yahoo or one of the other subject indexes. Or they can sign up for one of the many new news-filter services, or for what Graef calls "awareness services," now available online, some for a fee and others for free. These services survey an organization's or individual user's interests, then use key words to search appropriate databases, news feeds and other Internet sources and, in most cases, deliver the results at a set interval (such as daily or weekly) to a mailbox address. Examples include Farcast from Farcast Inc. of Menlo Park, Calif. (*demo@farcast.com*), Stanford University's free Netnews Filtering Service (send the word "help" to *netnews@db.stanford.edu*) and NewsPage from Individual Inc. of Burlington, Mass. (*http://www.newspage.com*). Users can also subscribe to Internet mailing lists that automatically deliver news on selected topics periodically via e-mail.

Data culled directly from the Internet can be more current and less expensive than what commercial databases offer, but it may be harder to find. Until a much larger chunk of published information makes its way to the Internet, and until the Internet's search tools become more refined, corporations shouldn't yet drop their commercial service connections.

Customized News Services

Companies that like the idea of this type of news filter but want to cast their nets beyond the Internet may be happy with one of a growing number of commercial news feeds, filtered according to a company's criteria and delivered via e-mail, Lotus Notes, facsimile or, in the case of Waltham, Mass.-based Desktop Data Inc.'s NewsEdge, by satellite or FM broadcast. Services like NewsEdge and Individual Inc.'s First! serve up a wealth of data from journals and other expensive business- and industry-specific periodicals that don't offer their wares over the Internet. Individual, for example, offers a variety of news services, but its most popular by far is First!, designed for enterprisewide distribution. The service, which is currently received by some 35,000 readers, monitors more than 450 sources, including "very specialty- and niche-oriented newsletters that you're not going to find on the Internet or anywhere else," says Paul Pinella, First! product manager. Because Individual has already negotiated usage rights with these publishers, First! users receive data that is in full copyright compliance for as long as they remain subscribers, an issue that many companies have yet to resolve with material from the Internet.

Transport Canada's Airports Group is just now completing a small, six-month pilot project with Individual's First! service, which the division receives over Lotus Notes, and Horton says he is pleased with the results so far. "We were looking for a good world spread of news, and we wanted to see news that was easy to read," Horton says. Lotus Notes allows his users to simply use different Notes views to further filter the First! news feed to fit their particular interests.

Even so, Horton supplements First! with the Faulkner news service from Faulkner Information Services in Pennsauken, N.J., which focuses more on management issues and is delivered monthly via CD-ROM. Pinella agrees that First! isn't designed as a be-all and end-all news system. "My sense is that when we come in, people don't stop their subscriptions to *The Wall Street Journal* or to trade publications. We're there to capture the stories you'd [otherwise] never get to see from publications you're not familiar with."

Stanford University's free **Netnews** Filtering Service lets users set up their own news filters. It then checks databases, news feeds and other Internet sources and forwards the first 20 lines of relevant articles along with ID numbers, which can be used to request full text. For more information, send the word "help" to *netnews@db.stanford.edu.*

Like the commercial online services, customized news feeds don't come cheap. First! pricing is based on both the number of stories a site receives and the average number of readers. As a very general guesstimate, Pinella says clients spend an average of $10,500 a year for the daily news service.

Horton, who concedes "we are getting a little broke here in Canada," says that, at least in its pilot implementation, the First! service is worth the money in his estimation. Even so, information is always a hard sell to upper management. "If you want a computer or a new laser printer, senior management says OK because that's something you can physically see. When you go up and tell them you want $1,200 for an information feed that they cannot physically see, it's different."

Hard Copy: Newsletters, Books, Reference

One reason Farrell pays top dollar for Knight-Ridder's service and Horton is willing to go to bat for First! is that these services provide access to numerous highly specific, hard-to-find industry newsletters, some of which are published daily, but most of which come out weekly, monthly or quarterly. Even with such services available, many organizations continue to subscribe to the newsletters and journals most crucial to their businesses, according to Patricia Wysocki, execu-

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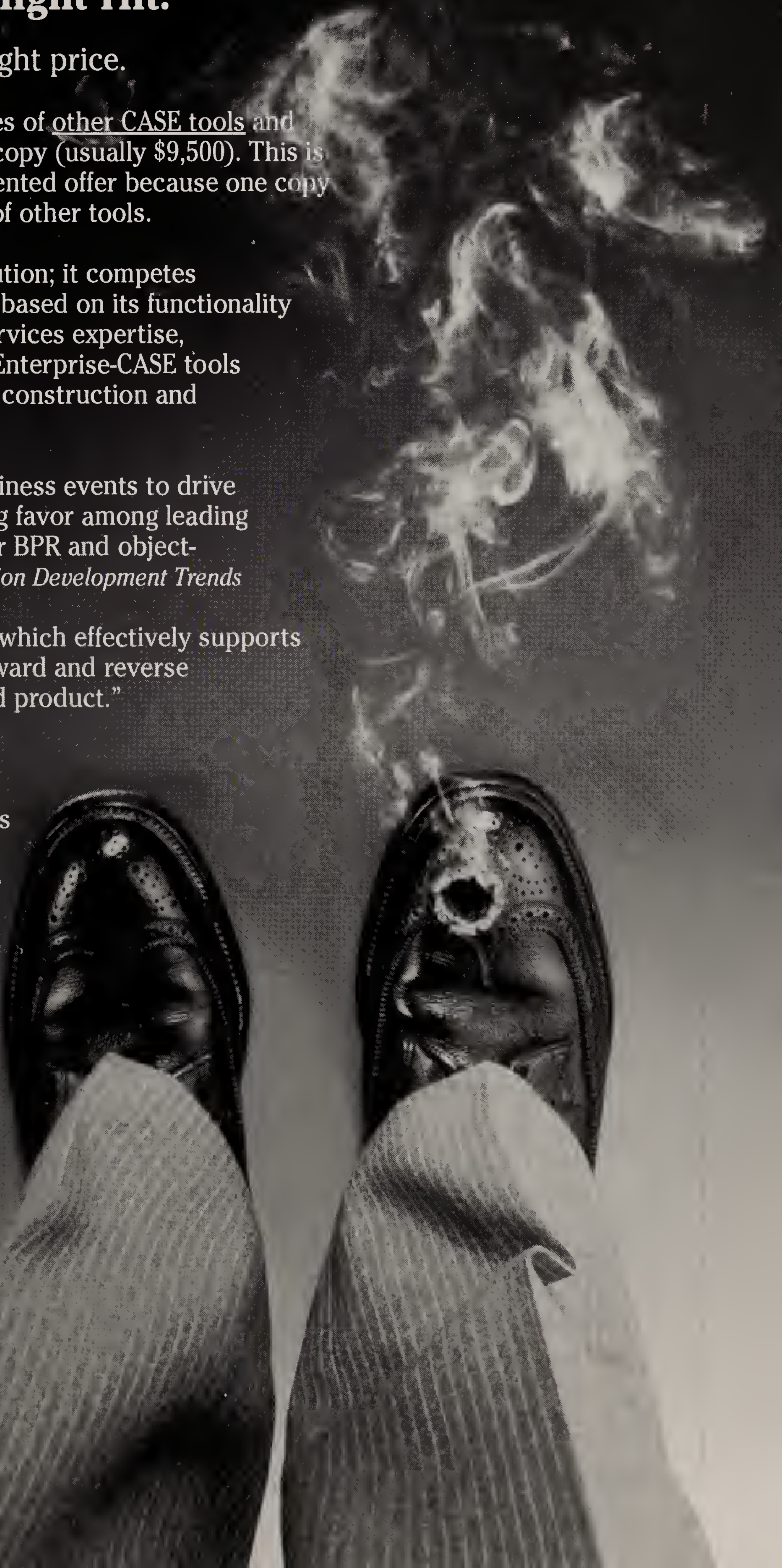

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tive director of the Newsletter Publishers' Association, an Arlington, Va., trade group that boasts some 700 corporate members representing about 2,300 newsletters.

Organizations searching for a complete list of newsletters and periodicals should consult either *Ulrich's Guide to Periodicals* (R.R. Bowker, New Providence, N.J.) or the *Oxbridge Directory of Newsletters* (Oxbridge Communications Inc., New York), Wysocki says. Newsletter subscriptions range from about $12 a year for 12 issues to thousands of dollars for daily bulletins. But such publications thrive because they provide in-depth information and analysis that's impossible to find anywhere else and offer highly customized service, in some cases delivering information online, by fax or even by courier.

A growing number of commercial news feeds deliver via e-mail, Lotus Notes, facsimile or another method information filtered according to a company's criteria. NewsEdge from Desktop Data Inc. and Individual Inc.'s First!, for example, serve up a wealth of data from journals and other expensive business- and industry-specific periodicals that don't offer their wares over the Internet.

Further, newsletter publishers are beginning to offer a slew of supplementary services, Wysocki says. Some publications, for example, will fax bulletins on particular subjects so that interested clients can read the news as it happens. Others have responded to customer concerns about archival data by offering an index on disk or giving readers access to a dial-up bulletin board. And some newsletter publishers offer consulting services, host industry-specific conferences or offer audio/visual presentations based on newsletter articles.

Newsletters can be an invaluable source of information, particularly financial material, agrees Dolores Schueler, branch librarian of the Kirstein Business Branch of the Boston Public Library, but she does offer one caveat: "Many of these newsletters are done by maybe one person, so you are just getting that one person's viewpoint." For investment news, Schueler points people to *The Value Line Investment Survey* (Value Line Inc., New York), a weekly newsletter that offers a broader range of perspectives. Likewise, she recommends the *Wall Street Transcript* (Wall Street Transcript Corp., New York), a weekly periodical of brokerage-house reports on specific companies and industries, with each issue devoted to a different topic.

For researching competitors, particularly public companies, Schueler

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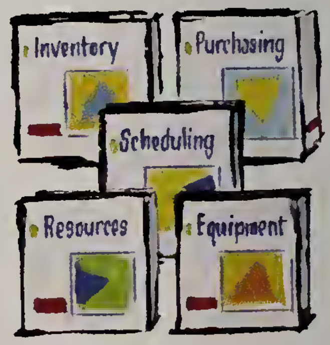

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says there is simply no substitute for the basic reference manuals: *Standard & Poor's Corporation Records*, *Moody's Manuals* and *Barron's* as well as the Security and Exchange Commission's filings, which are now available over the Internet or via a better-indexed, more easily searched compact disc called *Compact D* (Disclosure Inc., Bethesda, Md.). "The CD is awfully easy to use, and it gives the quarterly financial figures, which can be hard to find," Schueler says.

> ***Standard & Poor's Corporation Records*, *Moody's Manuals*, *Barron's* and the SEC's filings, which are now available over the Internet or on CD, are key sources for researching public companies.** **For private companies, check *Standard & Poor's, Dun & Bradstreet, Ward's Business Directory* or individual states' industry and manufacturing directories.**

Researching private companies can be a bit trickier, however. If the company is large, *Standard & Poor's*, *Dun & Bradstreet* or *Ward's Business Directory of U.S. Private and Public Companies* (Gale Research Inc., Detroit) will work. Otherwise, Schueler advises turning to individual states' industry and manufacturing directories (such as New York-based BRP Publications Inc.'s MacRAE line of state directories or those published by George D. Hall Co. in Boston) or to use *Dun's Business Locator*, another CD-ROM product, to determine which Dun & Bradstreet sourcebook tracks the company.

To search for competitors by field—for example, to find a list of competing plastics manufacturers—Schueler turns to the *American Business Disk*, a CD-ROM Yellow Pages-type listing of companies that also organizes firms by SEC code, or to the *Small Business Sourcebook* (Gale Research), "a handy tool for getting different types of information for smaller businesses."

The Kirstein Library supports a wide variety of CD-ROM offerings and is in the process of exploring other online options, including the Internet, but Schueler tends to take the long view when customers suggest that online access is best. "People try an electronic search from their office, then they wind up here, looking it up in the book," she says. An online surf can be a good place to begin, but "it isn't everything by any stretch of the imagination," Schueler says.

"I tell people it's crucial for them not to give up. People have to keep searching and searching to find the things they may have missed." CIO

Tracy Mayor is a freelance writer and editor based in Beverly, Mass.

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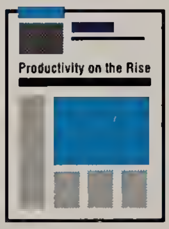

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No News Is Good News

A champion of the people's right to know, he refused to let truth stand in his way

BY STANLEY BING

As a businessperson, I crave information. I can never get enough of it. I've always gotta get more of it. Ladle it up, chow it down, that's me. 'Cause information is good, ipso facto. Information is power. Information is money. Information is a fat slice of layer cake you've got to eat right now. Information is on the highway. Information is on the byway. Pile on the factoids! Bring on the proprietary data! Information—the lifeblood of the people! Keep it comin'!

So it pains me to tell you that I have in my possession a tiny little nuggetine of protoinformation that I don't want you to have. It belongs to me. I don't have to disclose it. It would be bad for business if I did. It's not material in any legal sense, so I'm under no ethical or financial obligation to do so. Fortunately for me, the Constitution doesn't mandate your access to it. It's mine now, and if things go well, it'll stay mine until I choose to tell you about it.

You can console yourself with the thought that my precious nub of information is really nothing but a rumor of a suspicion of a hint of something that may someday, if 16 other variables fall into place, turn into a fact. When and if that happens, the gob of potentialities will coalesce and boom! There will then be information. Get it early and you'll think you know something when in fact you won't. You'll know nothing. But you'll know more of nothing. That's the information revolution in action.

Pardon me. I'm sitting at my desk on the 37th floor, staring out at the city steaming and belching vapor all around me. There's nothing much I can do right now. Just wait to see how *Slag Week* is going to deal with a grotesque sibling of the embryo of information I'm trying to keep from you. It's not the thing itself; it seldom is with *Slag Week.*

It all started yesterday at 2:37 p.m. It was a day much like any other, which is to say, from hell. Then the phone rang. It was Larry Blatt, reporter. Now, Larry Blatt could be his real name or maybe not. If you know a Larry Blatt, perhaps it's he. Let's pretend it is, because it could be, and nobody's proved it's not.

"Hello," I say into the receiver. I like this as a response because it imparts no information whatsoever.

"Stanley Bing?" Blatt murmurs into the phone. "Larry Blatt. Got a minute?" I know immediately it's trouble. He's in his Bob Woodward-in-heat hat, chasing down an enormous scoop for *The Daily Planet*. "I have a very good source close to the negotiations who has told me you people are getting together with a consortium of players to buy Romania. I wonder if you'd like to get a comment in before we go to press."

I feel sick. It's false, completely without foundation. Romania's growth vectors are way south of any serious acquisition candidate on our roster. Still, the damn thing isn't so radically, dramatically way-out that it couldn't be slightly conceivable. These cruddly little pseudopods of data pop up all the time. Last week, rumor had it that my entire company was being sold to

ILLUSTRATION BY TRAVIS FOSTER

Ron Perelman. Before that, we were purchasing Ron Perelman. Neither was ever true. Of course, on the other hand, they weren't untrue per se, either, since they could be happening right now in an alternate universe.

"No, Larry," I tell the reporter. "Nothing of the sort is happening, let alone contemplated. You've got a bum steer. Sorry." As I'm saying this, I can feel his cynicism, professional disappointment, and raw ambition seeping through the phone and running down the inside of my ear. I switch the receiver to the other side of my head. That, too, is quickly moistened.

"I'm not asking you whether it's happening," says Blatt. "I know it's happening. I just want your comment on it. Should I put your denial on the record?"

"No, Larry," I tell him. "Nobody believes a denial. What I'm telling you is not a denial. It's an assertion that what you are about to report is not only not happening, it's not going to happen. Not ever. You have bad information. Why report it?"

"I have to report it," says the reporter. "I have a source on it."

"Can we go off the record, Larry?"

"Off the record. Yeah, sure."

"God's honest truth, Larry, this is bogus. And if it appears in your paper, it will create enormous chaos and at least five follow-up stories that will gain in collective weight until it won't make any difference whether it's true or not. All that will matter is what has been reported."

"Uh-huh," says the reporter. He is typing. This makes me nervous. What's he typing? I haven't said anything! I can feel a bubble of bile float from the bottom of my stomach and into my esophagus. What can I do? I rack my brains.

"Tell you what, Larry," I say. "If I can find three totally reliable sources who will tell you the absolute truth, will you consider not reporting a completely erroneous thing as if it's news?"

"It's a big story," says Blatt.

"No, Larry," I tell him, "it's not a story. It's a leak planted with you to benefit the person who leaked it to you. Can't you see that?"

"Well," says Blatt, "you'd have to give me quite a lineup to make me believe that it isn't going down."

"Fine," I say. "We'll be back to you."

You can console yourself with the thought that my precious nub of information is really nothing but a rumor of a suspicion of a hint of something that may someday, if 16 other variables fall into place, turn into a fact.

At 3:21, Blatt talks with Kline, a gigantic player who would indubitably be part of the crafting of any such deal. Kline asserts, on the record, that we're not buying Romania. "I can get all the pastrami I want right here in New York," says Kline. "He typed that," he tells me later. "It was a joke. I hope I don't come out looking like a jerk."

4:07: Blatt talks with a representative of our supreme executive structure in Houston. He is told that "the company does not comment on idle rumor and speculation." This, I later learn, he takes as confirmation of his rumor.

4:32: Blatt talks for three minutes with Walt, our chieftain. Walt tells him that we are not buying Romania but lets him know that we could if we wanted to. This, I later learn, Blatt takes as confirmation of his rumor.

5:12: Blatt talks with three of our operations VPs from around the nation, who tell him why it would be stupid and dilutive for us to buy Romania and that as far as they know, we are not doing so. This, I later learn, he takes as confirmation of his rumor, since none of the commenting parties are in a position to know what might be going on behind their backs.

5:55: I have a vodka and tonic on the train.

7:15: I am having a vodka without tonic at the kitchen table. My daughter is doing her math homework. My son is wrestling with our cocker spaniel. My wife is cooking something that smells good. The phone rings.

"I'm just about ready to put this thing to bed, Stan," says Larry Blatt.

"My editors want me to pin down whether, even though you say it's not happening right now, you think it could happen. It's well known that Romania is in play. There are tremendous opportunities to reengineer it and make it profitable. You guys make perfect sense as a buyer. So...could it happen? What do you think?"

"Could it happen? Sheep could fly at some point, Larry. Anything is possible. What I'm telling you is that it is not happening. Doesn't that make any difference to you?"

"So what you're telling me is that it's not impossible for something like this to happen," says the reporter.

My daughter has begun to sing, "What's the frequency, Kenneth?" very loudly and dance around the room, bumping into things. My son is barking. What is Blatt saying to me? There is a dish of spaghetti in front of me now. I want this to be over.

"Not impossible, Larry?" I say. "Are you in the business of reporting what is not impossible?"

"Honestly, Stan, I have this monster space to fill, and it's really late in the day. Do you have any final comment?"

A comment. On what? "We're in a growth mode," I say, wiping a rivulet of tomato sauce from my chin. "Any creative move within our industry is interesting to us, but we're not about to do anything in the near future. I hope you'll be careful to characterize anything that you write, Larry, as a rumor."

"I need a picture of your chairman...what's his name?" says the reporter.

"No picture, Larry. You don't need an illustration of something that's not happening."

"Maybe we have one in the file," he says and hangs up.

That was last night. This is now. The afternoon mail is placed on my desk. Ah, here it is. *Slag Week*. And, oh, look. Right there on the front page is our logo next to a screaming headline that reads: ROMANIAN RHAPSODY? Underneath that banner is a smaller headline that reads: 'ANYTHING COULD HAPPEN,' SAYS TOLEDO CORP. SPOKESMAN. There is a picture of Walt, my boss. The story itself is 200 words, tops. It jumps to another page, where the runover takes up a quarter of an inch:

Industry sources today confirmed the imminent purchase of the entire nation of Romania by the Toledo Corporation. Romanian officials could not be reached for comment, although they have in the past expressed interest in any serious offer. The purchase of the economically challenged Eastern European nation, which was rumored for months and reported on recently in these pages, comes at a time of great global expansion for American corporations. Industry consolidation also continues apace. In the past months, the Furtz Company merged with Titus Products, Gretz Brothers was acquired by Merblin Manufacturing, and in the largest sale to date, Vizcor gobbled up Blurtzheim, once a leader in the global-distribution side of the business. This acquisition could put Toledo in the top ranks of those companies both domestically and abroad. "We're in a growth mode," said Stanley Bing, vice president of Toledo. "Any creative move within our industry is interesting to us." Bing went on to deny the reported transaction. Sources close to the negotiations indicated that a formal announcement would be forthcoming.

> **"Not impossible, Larry?" I say. "Are you in the business of reporting what is not impossible?"**

Not a bad story. I almost believe it myself. I wish I could tell you more, but I have to get going. There's a reporter on line one from *The Wall Street Journal* who is angry with me for not giving her the story first. There's another from the *Times* who wants to make sure they're spelling Walt's name right. And a camera crew from CNBC is waiting in the lobby. I told them not to come, but they're here anyway, and I don't blame them.

The people have a right to know. CIO

This column was originally published as "Information Underload," in Esquire. *Reprinted courtesy of the Hearst Corp. Stanley Bing is a contributing editor of* Fortune Magazine.

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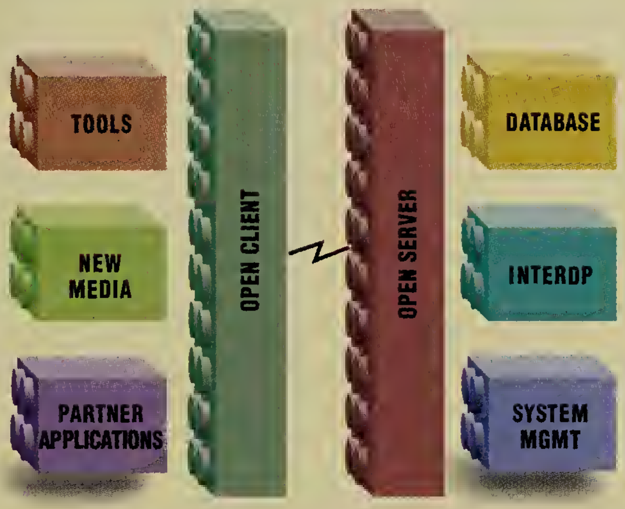

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Coherent Communications Systems Corp. says its hands-free audio conferencing unit ConferenceMaster Elite will offer exceptional performance on even the poorest of telephone lines for less than the traditional audio-conferencing duplex unit. Coherent, based in Leesburg, Va., uses a new state-of-the-art 16-bit codec for improved sound clarity and 360-degree sound coverage for call participants as far as 15 feet away from the speaker. Automatic gain control allows every participant, even those facing away from the ConferenceMaster Elite, the ability to speak naturally and still be heard clearly from anywhere in a room.

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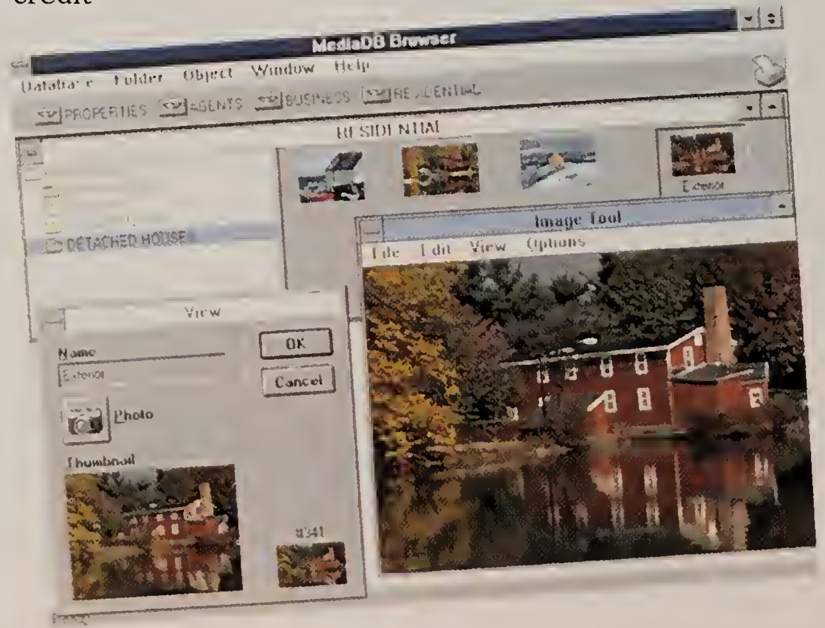
ConferenceMaster Elite is a portable, ergonomically designed unit that plugs into a standard analog telephone jack and electrical outlet. ConferenceMaster Elite is available for $995. For more information, call 800 443-0726.

Multimedia Management

Every organizational nut knows that one of the biggest problems with the surge in multimedia is how to store all those CDs, antiquated LPs, videotapes, old home movies, books on tape and more. Corporations are also coming to grips with the organizational quagmire that threatens to overwhelm their multimedia operations. Enter MediaWay Inc.'s family of multimedia database-management and -cataloging applications called MediaDB.

Organizations such as newspapers, real estate brokerages and high-tech marketing firms must deal with the technical challenges of storing and archiving video clips, news clips, sound clips, photos and other multimedia materials that require managing massive amounts of memory-hungry information and unstructured relationships between items. MediaDB, a database management system that can modify multimedia information in an object-oriented environment as easily as it can traditional text and numbers, is designed from the ground up specifically to tackle multimedia organizational challenges.



MediaDB DBMS version 2.0 ranges in price from $2,500 for a five-user license on Novell NetWare to $200,000 for a 1,000-user license on Unix servers. For more information, call MediaWay in Santa Clara, Calif., at 408 748-7400.

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Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semimonthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1995 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: ‡. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. CIO is free to qualified information executives. To all others the one-year basic rate is $98 for U.S. and Canada, $185 to foreign countries (payable in U.S. funds only). The single copy price is $7. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 872-0618. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

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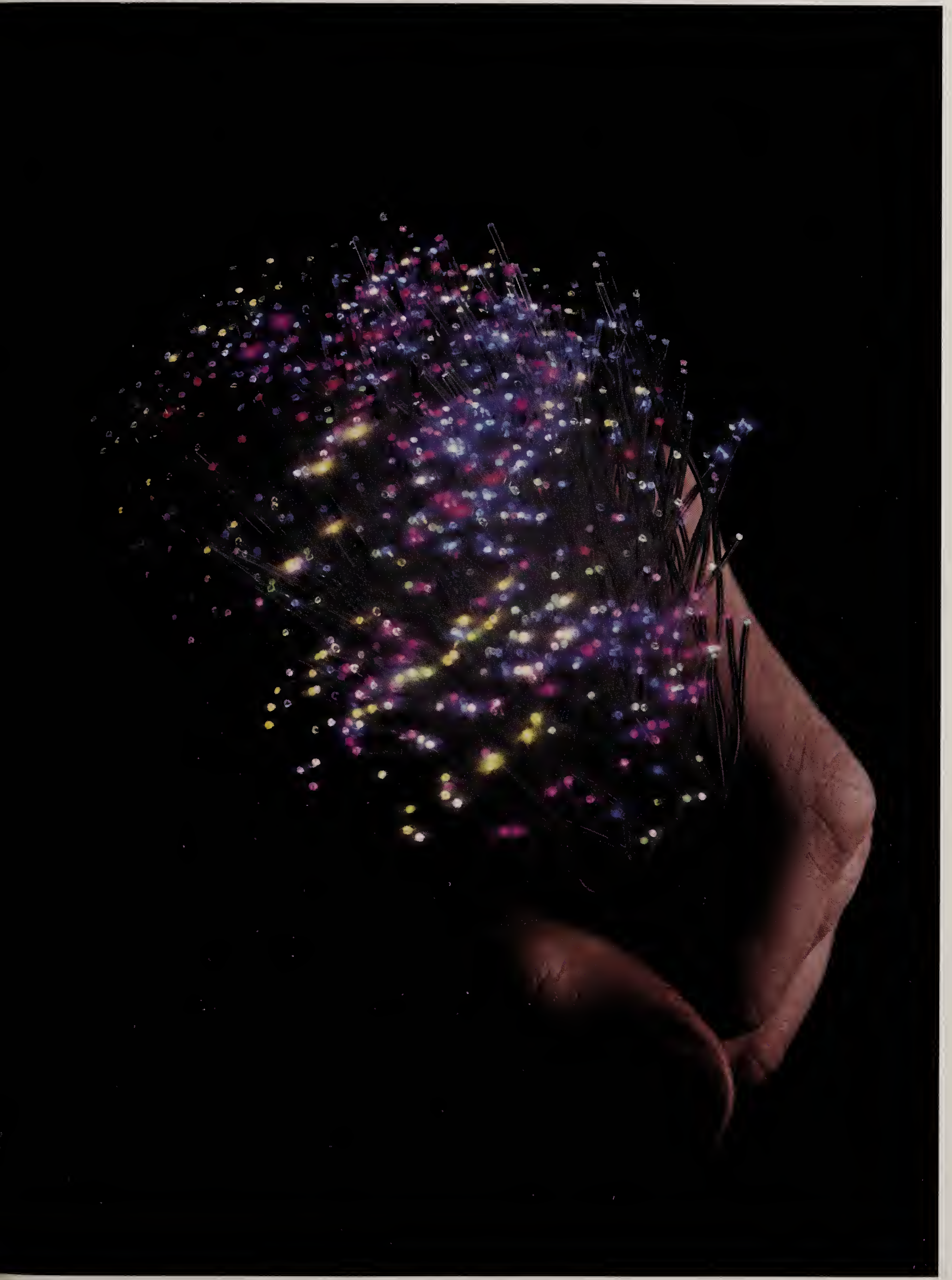

Hiring Outside the Box

BY LAURENCE PRUSAK

While it should be self-evident that information and technology are not synonyms, many companies continue to treat them as such, making the rather rash assumption that building a physical technology infrastructure is the same thing as practicing strategic knowledge use. As one executive said when I asked him how his company was managing information, "Last year we spent $81 million on PCs—*of course* everyone now has the information they need!"

Not true. To convert information into strategic knowledge (a universal goal in today's knowledge economy) companies must focus at least as much on information content as on delivery. That means grappling with somewhat esoteric questions, such as what information actually is, how it is used, how it brings value—and lastly, but not primarily—how technology can be harnessed in the service of competitive knowledge use.

These are big issues, and they deserve broad, well-informed consideration. Unfortunately, IS organizations are far better versed in the computer than in the social sciences and nearly always define them from a purely technical point of view. What IS needs (quite desperately, I feel) when tackling problems such as how to deploy intellectual capital, is the freshness, creativity and expertise that can come from a cross-disciplinary approach.

If IS wants help with knowledge management, it should ask information experts. If it is interested in how people use information, it should ask people experts. So try this: Next time you're in the market for help, consider bringing aboard a librarian, a journalist or an anthropologist.

The notion of hiring librarians may sound anachronistic, but the profession has a far longer and richer history of information expertise than IS. In the pre-PC era, librarians controlled most information and its use within firms, particularly external information links, such as third-party researchers and electronic databases. That monopoly ended with the advent of distributed computing, which allowed end users to unearth their own information and made them responsible for its quality, cost and value. But the change has not been entirely fortuitous: Since most end users lack librarians' professional research skills, their information-gathering efforts have often been less than stellar.

As knowledge gains a higher profile within companies, librarians are increasingly needed to act as filters, working with IS to acquire and efficiently disseminate high-quality information and thus reduce corporate information overload. At present, however, fewer than 15 percent of corporate librarians work within IS.

Journalists, too, possess core competencies that can benefit the IS organization and the company as a whole. They are trained to quickly and accurately assess even the most chaotic situations from a variety of perspectives, and to rapidly gather the most critical facts and organize them into a readable, easily comprehensible whole. For these reasons, journalists offer a much higher value than flow charts and other models that bear only a passing resemblance to reality.

The case for hiring an anthropologist is somewhat more oblique. Yet the IS organizations in a number of consulting, car and chemical firms have done just that.

Social anthropologists are trained to unobtrusively observe human behavior and then document what they see. So rather than trying to ascertain individuals' information use by asking them about it (what are your system requirements? how do you do your job?), anthropologists can actually watch people at work and get a far more accurate understanding of their information behaviors.

The approach applies to understanding customer behavior as well. Consider the example of a well-known high-tech firm that was losing market share in emergency-room diagnostic tools. The company was building these tools based on emergency-room physicians' descriptions of their own activities; but when it sent a team of social anthropologists to observe and document these health professionals in action, a very different picture emerged. The company redesigned its tools based upon the anthropologists' report—and regained much of its market share.

Clearly, these three types of information specialists possess skills that can add depth and scope to a company's information-gathering and -dissemination strategies. What they bring to the table is not just new expertise but a fresh approach to managing knowledge.

Laurence Prusak is a principal at Ernst & Young's Center for Business Innovation in Cambridge, Mass.

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